

General View of River—Looking South from Port Commissioners' House.

THE CALCUTTA PORT TRUST

A BRIEF HISTORY OF FIFTY YEARS' WORK

1870-1920

THACKER, SPINK & CO.

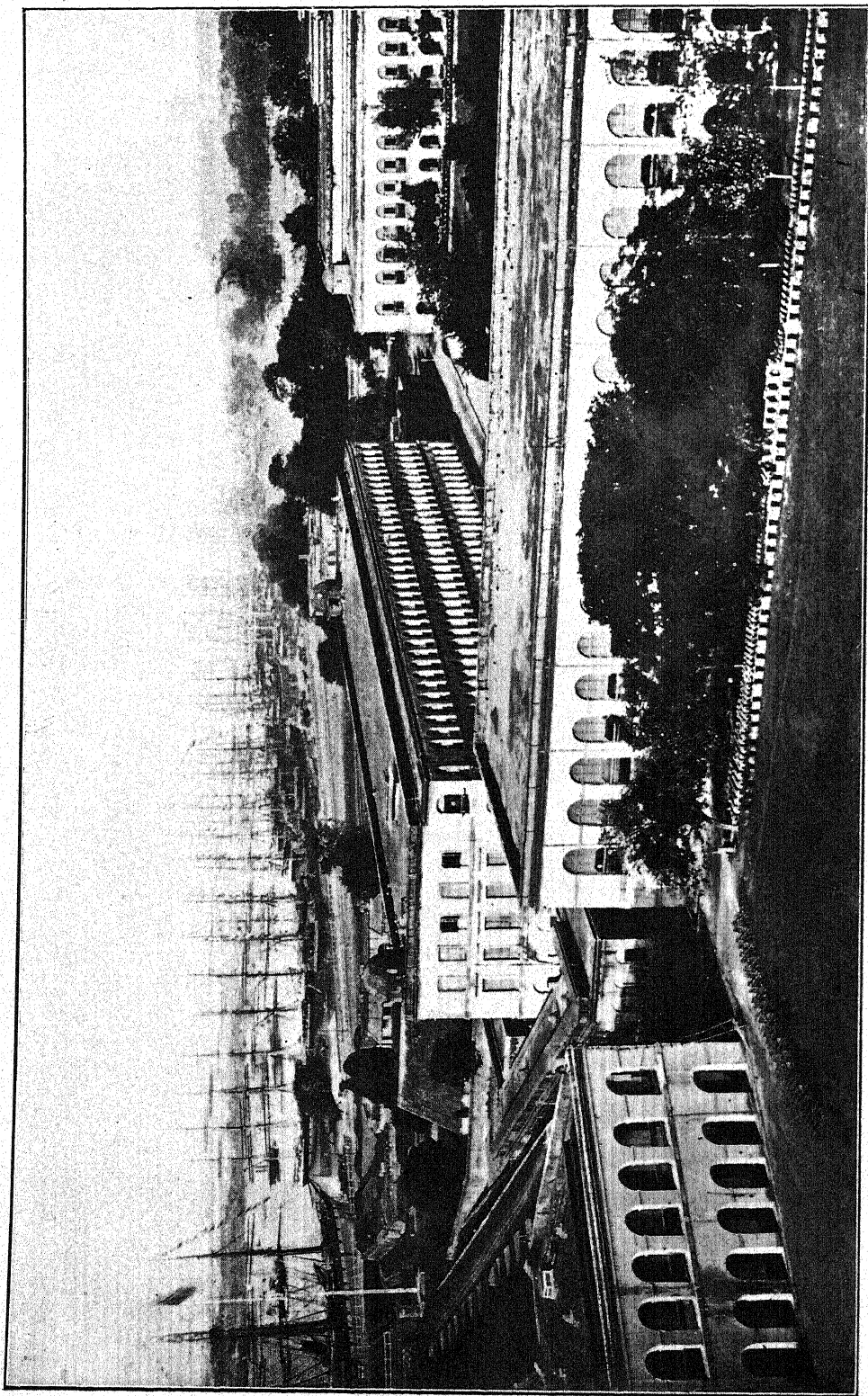
CALCUTTA AND SIMLA

1920

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CALCUTTA

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The Day of the Sailing-Ship.

INTRODUCTION.

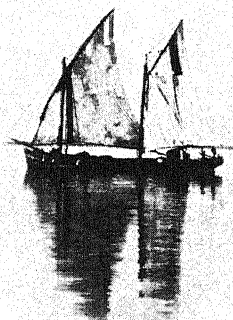
THE Calcutta Port Trust dates its foundation from 1869, and this little book is confined in the main to the events of the last 50 years. Yet for the historian one cannot but feel how much more interesting would be the story of the port from the days of Clive and Warren Hastings. That picturesque and romantic tale of early days may not have much bearing on our narrative, but to touch on it for a moment may be forgiven, for the comparison is instructive. Time was of small account and there was no racing for a jetty berth, but the tides and currents of the Hooghly must have been an exacting test of seamanship in those days. Charts were few and not too accurate; the Pilot Service was already at work, but without the information which is now given by the River Survey Department; and there were no steam tugs available, so that the navigation of the river was a constant struggle of human skill against the vagaries of nature. An outward bound ship might drop down from off Kidderpore to Diamond Harbour in, say, seven days or less during the freshets, but to come up the river was another matter and for this three weeks was no excessive allowance. Small wonder then that our ancestors left the ship at Kedgerie to travel up by horse, palanquin or row boat, and Kedgerie, of which little is now left save its pathetic cemetery, was then a busy little station with more than one tavern built to accommodate waiting passengers. For the whole journey from Europe round the Cape at least several months were required; in 1789 the sailing ship "Stuart" left Amsterdam some 14 months before she made Calcutta, and it was not until 40 years later that the "Seringapatam" set up a higher standard by completing the voyage in 79 days. Naturally, to meet the time and risk of these voyages, freight charges were high; in 1795 the freight on a ton of wine was over £30 and insurance stood as high as 12 guineas per cent. As the years went by, improvements and changes became the order of the day. As early as 1801 it was found possible to build at Tittaghur a vessel of 1445 tons burden, the "Duchess of Sutherland," the largest vessel built on the Hooghly up till then, and another important improvement was the construction in 1823 of the Strand Road, in which connection it is curious to read of the protests of the shipbuilders, who then had their docks in Clive Street and not unnaturally regarded this drastic proposal as ruinous to their interests.

When we come to the year in which the Port Trust originated, we are not far removed from the memory of living men, and from their stories one can imagine, with some degree

of accuracy, the experiences which befell the Master and crew of an East Indian "Clipper," such as the "Sir Lancelot" or the "Star of Greece"—the latter boat having established the record for a voyage round the Cape from England to Calcutta in about 60 days. One can picture such a vessel arriving with all the glory of her full spread of canvas at the outer light ships—one of which is still in existence, having just completed a 50-year life; she would be met near the Sandheads by one or more of the tugs, the "Rattler," "Court Hey" or "Challenge," or perhaps by one of the newer twin-screw tugs, the "Retriever" (first of that name and lost in the cyclone of 1887), or "Warren Hastings," and having come to terms with the Tug Master in strict accordance with the laws of supply and demand at the time, she would commence her voyage up the Hooghly. Drawing perhaps only some 20 to 25 feet, she should have had little difficulty in making her way safely up the river, even with the less elaborate buoys and marks of that day and the absence of any dredging of the river bars. Having arrived at the port, she would drop anchor at one or other of the moorings selected according to her cargo. If this was salt, somewhere not far south of the site of the floating bridge, if coal from England, somewhat lower down, and if case oil from America, at Mutiabrooz. If she were one of the steamers then arriving in increasing numbers, she would come up without a tug, and be moored at one of the jetties, there to discharge her general import cargo of piece-goods, iron and steel and oilmans' stores. The skipper would leave his vessel, and make his way to the bank of the jetty gates, there to be met by one of "Buggy Steuart's" hired traps, which it was incumbent upon every master mariner to use during his stay in port. He would, no doubt, drive first to the office of his Agents, one of the old type of buildings, situated in the Strand Road, Clive Street or in the neighbourhood, and would arrange to pay off about half of his crew, keeping the other half in order to work the ship, and thus save as much as possible during the ship's three or four months' stay in port. He would then no doubt repair to the coffee shop, which was then situated where the southern extension of the Bank of Bengal now stands, and meet his fellow-captains to exchange experiences. In the meantime, his apprentices would be finding their way to the boarding house kept by Mrs. May in Dhurumtollah, and many of the crew to less reputable resorts around Dhurumtollah and Bentinck Street, there to spend their hard-earned money, and when this was done, to find a homeward bound ship. On Sundays, there was the Floating Bethel anchored off Prinsep's Ghât, where the Port Chaplain exercised some countervailing influence.

All this would be in a town very different from modern Calcutta. Prinsep's Ghât was then really on the river bank, and the present Strand Road ran southward straight towards the Hastings Bridge. North of the Bank of Bengal, the Port Commissioners' Jetties and the Strand Road presented a very different aspect to their present-day appearance. On the riverside, all the sheds were single-storied, the cranes were old-fashioned steam cranes, and the railway lines far less conspicuous. On the eastern side of the road, many of the present lofty buildings were non-existent, though the Bank of Bengal and the Sailors' Home were already there.

Generally, the conduct of maritime affairs, like that of everything else, was of a leisurely kind. There was no night or Sunday work, and ships were prepared to stop for weeks and even months, while leisurely discharging their inward cargo and accumulating their outward cargo of jute, tea and other goods, with stone or scrap-iron as ballast.



THE RIVER HOOGHLY.

CALCUTTA, like London, Liverpool and Hamburg, is situated roughly at the head of navigation for ocean-going ships. It is true that several of the older settlements, those of the French at Chandernagore, the Portuguese at Hooghly and Barnagore, the Danes at Serampore and the Dutch at Chinsurah, were situated some miles further up the river, but even if Job Charnock had not determined the present site of Calcutta, it is doubtful whether any more suitable site for the main port of Bengal could have been selected. True it is that there are 82 miles of difficult navigation between the city and the sea and that the choice of Diamond Harbour, so often mooted, would have eliminated two of the bars, including the "James and Mary," which symbolises for so many people the risks of the river; but, apart from the fact that the upper bars are no longer the determining factor, the exposed position of Diamond Harbour, the constant menace from storm waves, its distance from the city and the extra lead by railway for all traffic more than counterbalance this single advantage, and there is little cause to quarrel with the decision of our forbears in favour of providing facilities for maritime trade in the neighbourhood of Calcutta. The Hooghly, though small in comparison with its parent river, the Ganges, undoubtedly ranks amongst the important navigable rivers of the world. And there is not an experienced seaman who will not class it as one of the most difficult within his knowledge. But with all its traps and treacheries it is possible, with care and skill, to steam merchantmen drawing 30 feet of water 82 miles from the Bay of Bengal into Calcutta.

The river is formed by the union of three "spill" rivers, the Bhagirathi, the Jellingi and the Mathabhanga, which leave the Ganges at intervals and relieve it of its surplus discharge. The first two of these spill rivers unite at Nadia, which is the starting point of the Hooghly, 160 miles from the sea; the Mathabhanga joins some 30 miles lower down. The river then takes a southerly course through Calcutta, opening out into an estuary 50 miles below the city.

Being derived principally from the Ganges, which has an annual period of flood caused by the melting of the snows on the Himalayas, the volume of fresh water discharged from the Hooghly displays a marked seasonal variation. The freshet discharge during the period from June to October has been estimated at 300,000 cubic feet a second at Calcutta, whilst in the dry season, when the feeder rivers are almost empty, the fresh water discharge is barely one-tenth of that amount.

These facts are of the utmost importance to navigation below Calcutta. This freshet water is heavily charged with silt, the detritus of the mountains carried down by the Ganges and the alluvium of the plains washed away by the Hooghly's tributaries.

Calculations show there are 1.1 cubic inches of solid matter to every cubic foot of water, and sixty million cubic yards of alluvium are carried past Calcutta annually. It is this alluvium of fine mud and sand which is responsible for the shoals so troublesome to navigation.

The river is tidal in its whole length from the sea to Nadia. During the ordinary spring tides the rise and fall at Calcutta is 11 ft. 8½ inches. During the extraordinary spring tides of March and April, and occasionally during the freshet season, a bore makes its appearance in the river, enrolling some danger to the shipping unless care is exercised. It is first visible at Brul, 24 miles below Calcutta, and is noticeable as far as Chinsurah, 23 miles above the port.

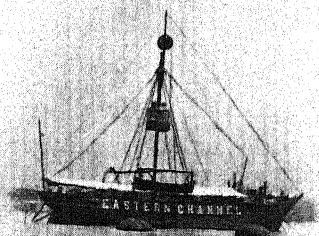
The tidal current may be divided into three periods. First, during the freshets, when the ebb current is strengthened by the freshet discharge; secondly, from October to February, when the flood and ebb current are balanced; and, lastly, from February to the freshet season, when the flood current is considerably the stronger. During the freshet the velocity at times is as much as 9 knots per hour, but as an average the current is usually from 5 to 6 knots.

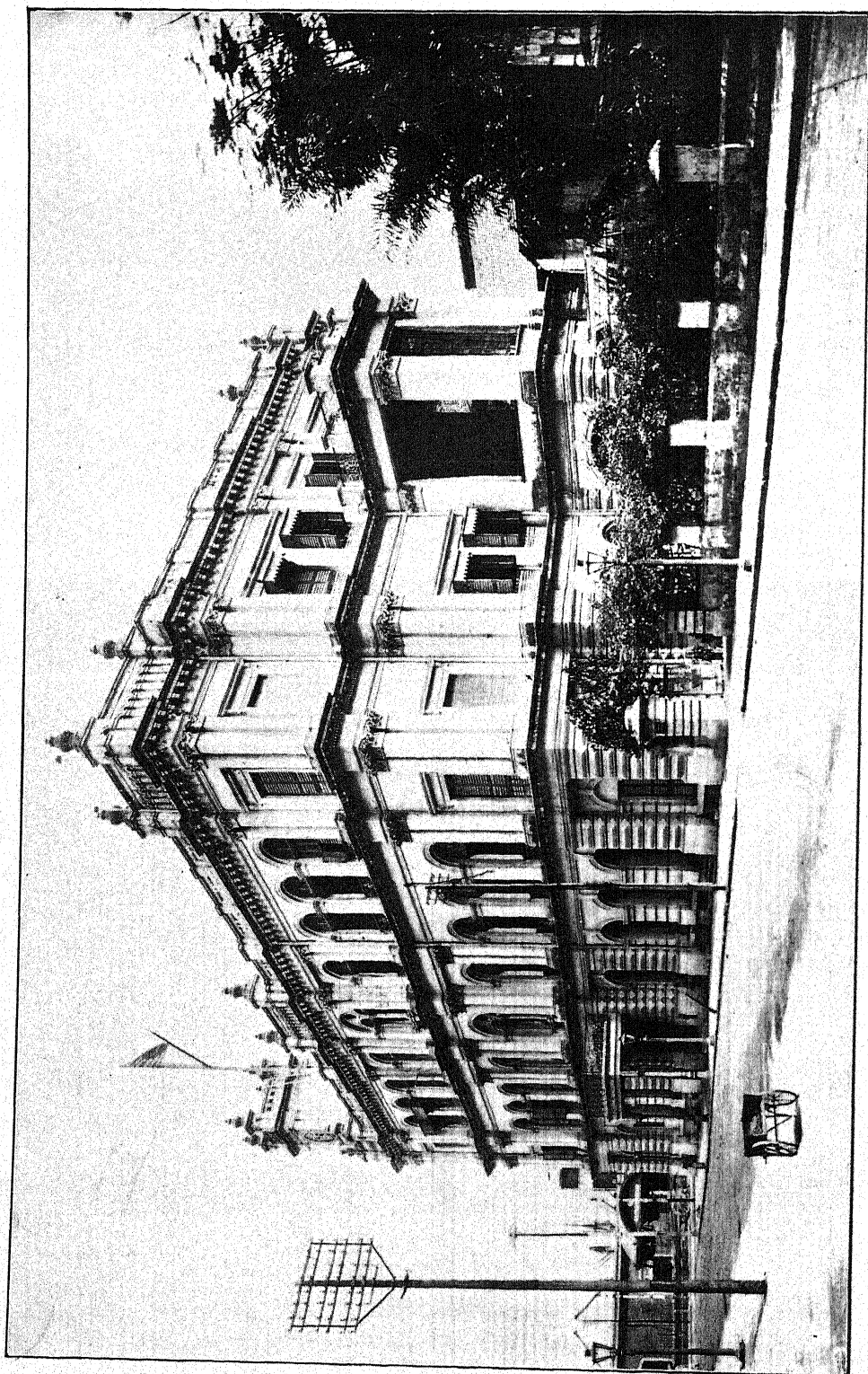
Bars : upper. In the upper portion, from Calcutta to Fulta, where the Damoodar joins it, the Hooghly presents the ordinary characteristics of a water-course in flat country. The concave banks hold the deep water channel close alongside them and from the convex sides shoals stretch out into the river, more or less according to the locality. The channel where it crosses from one concave to the next shoals, unless the bend is very abrupt, in which case the deep water of one concave bank merges into the deep water of the next. In this part of the river there are six shoal crossings. Three of these—the Panchpara Crossing, Pir Serang Crossing and Poojali Crossing—are not serious obstructions to deep navigation. Of the three remaining, that at *Moyapur*, 17 miles below Calcutta, develops a bar which is of importance, while the crossing at *Royapur*, 5 miles lower down, sometimes shoals seriously. Below Fulta, the Damoodar entering the Hooghly at right angles causes the river to depart from the normal régime. A double concave is created and the reach called the *James and Mary* between this point and the junction of the Rupnarain River, 5 miles lower down, is generally considered the most troublesome as regards navigation. The James and Mary Reach has two passages on either side of a central shoal—one created by the flood tide along the right bank and called the Western Gut, and the other the ebb tide channel along the left bank, called the Eastern Gut. The former was an alternative channel which opened when the latter shoaled seriously; but within recent years the bar at its upper end has blocked it altogether to deep navigation. The route therefore now lies through the Eastern Gut. At its lower end, however, the river takes an abrupt turn of about 80° or 90° and, the Rupnarain also entering at this point, a bar is here seasonally developed which has always been of great importance in the history of the river. Both the Eastern and Western Guts at their upper ends issue into the Ninan Channel, and another bar is periodically formed in this locality. Below

the junction of the Rupnarain River, the Hooghly resumes its normal regime and provides a deep channel into the estuary.

Bars : lower. In the lower or estuarial portion, the channel, after emerging from the narrow neck of land at Kantabaria into the wide expanse of the estuary, escapes from the rigid control of the banks and naturally splits up into two or three branches. These wind through numerous sand-banks to the sea, and the varying flow of water through them, determined by constantly changing causes both above and below, gives them a capricious character. A succession of pools is formed separated by shoal intervals or bars, and the navigable route is selected along the line connecting the pools and giving the best minimum depth throughout into Saugor Roads. The bars are constantly varying in depth, but it is generally found that when one bar shoals considerably, another outlet opens, so though wide detours have occasionally to be taken, the navigable channel in this section preserves a fairly normal general depth. There are two shoals in this section above Saugor—the *Balari* Bar near the head of the estuary, and the *Gabola* Bar.

Beyond Saugor, there are three sand-banks—the Saugor Sand, the Long Sand (with its prolongation, the Eastern Sea Reef) and the Eastern Brace—which slope down to the ten fathom line at the Sandheads about 40 miles from the mouth of the river, where vessels take their pilots. For over a century the Eastern Channel running up between the Saugor and Long Sands has been the ordinary route for navigation, and the Middleton Bar at the head of the Eastern Channel is the first shoal encountered by incoming vessels.





Port Commissioners' House.

CONSTITUTION OF PORT TRUST.

ALTHOUGH the first body of " Port Commissioners "—nine in number—were appointed in October 1870, the origin of their appointment dates virtually from the year 1861, when the Lieutenant-Governor of Bengal proposed to the Government of India " that it would be very advantageous for the city and for the Government to constitute a Trust for the Port and City of Calcutta, to undertake the management of all works for the improvement of the Strand and river bank between the Lock of the Circular Canal and Tolly's Nullah, the Board of Trust being constituted to represent the Government interest (Engineering, Customs, and Marine) ; the Commercial Trade, and Shipping interests (both European and Native) ; and the Municipal interest."

The Bill for providing the present system of municipal government for Calcutta, which subsequently became law as Act VI of 1863, was then before Council, and the Lieutenant-Governor's proposal resulted in an enquiry from the Government of India whether this Bill could not be enlarged so as to embrace within its scope the objects indicated. A reference was made to the Chamber of Commerce, and in June 1863 that body replied in favour of a separate Trust as proposed by the Lieutenant-Governor, stating that such a Trust would be better suited to carry out the works of port improvement than the Municipality.

In the meantime, however, the Government of India itself decided that a separate Trust should be formed, the reasons given for that decision being that, if the River and City Trusts were united, there would be a danger of the interests of the port being treated as subsidiary to those of the Calcutta Municipality. It was considered that the Municipality should be given a fair representation in the Port Trust, but nothing more ; and that the jurisdiction over the Strand bank should be vested in the Trustees, subject to the payment to the municipal funds of the same rates on buildings or works as are levied on similar descriptions of property in other parts of the town.

The Government of India also proposed to entrust to the Board of Trustees the whole conservancy of the River Hooghly from the northern boundary of the

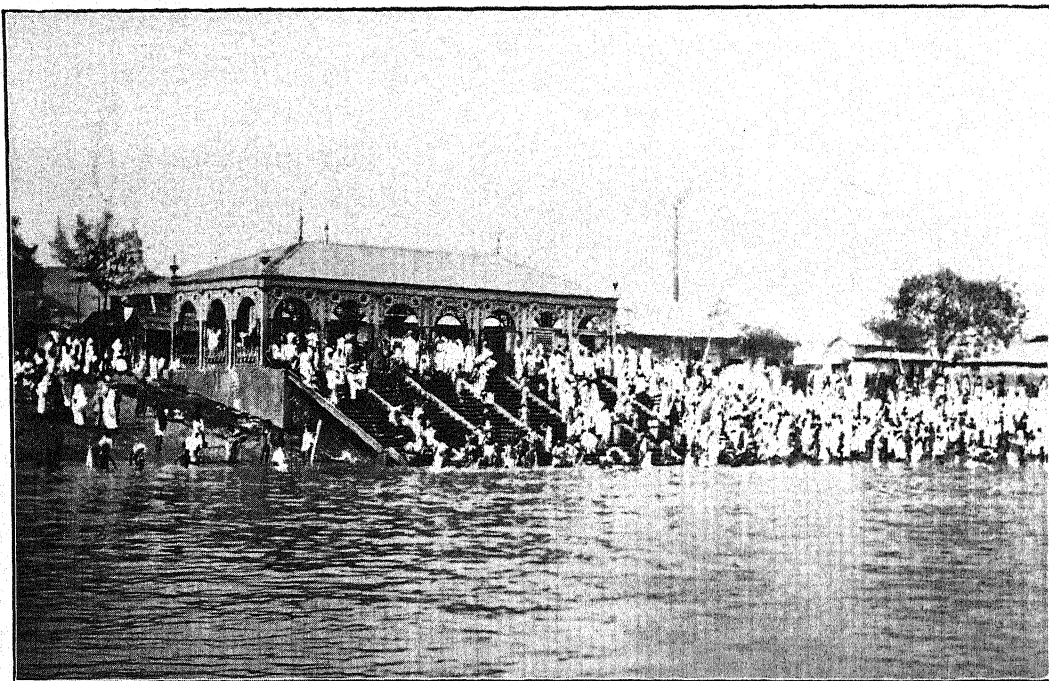
port to the Sandheads. His Honour the Lieutenant-Governor of Bengal was requested to have a Draft Bill prepared constituting a River Trust on the principles above enunciated.

Here the matter rested for nearly three years, and it was not until February 1866 that a Bill for the Improvement of the Port of Calcutta was introduced into the Bengal Legislative Council. This Bill, however, was framed in contravention of the principles laid down by the Government of India, inasmuch as it appointed the Municipality of Calcutta to be the Port Trustees. Against this step the Chamber of Commerce and the mercantile community of Calcutta protested strongly, to the extent of asking the Governor-General in Council to refuse to assent to the Bill after it had passed the Bengal Council. It was decided, however, that the measure adopted by the Government of Bengal should receive a trial, though not without the Secretary of State for India indicating anxiety as to the operation of a measure which had evoked so strong a protest from the Bengal Chamber of Commerce.

Act X (B.C.) of 1866, constituting the first River Trust for improving the Port of Calcutta, thus came into operation. Several gentlemen were appointed as Justices in order to represent the special interests concerned in the working of the Act, and Mr. Leonard was appointed Engineer to the Sub-Committee to draw up a project for the improvement of the port and river bank; but the great objection remained. The law made port improvement works a department of the Municipality under a Sub-Committee of Justices, the Chairman of the Sub-Committee appointed to carry out the provisions of the Act being the Chairman of the Justices, and the proceedings of the Committee being at all times subject to the confirmation of the general body of Justices.

The misgivings which had been entertained as to the working of Act X of 1866 were not long in being realized. At starting there were no funds with which to carry out improvements, and Government was asked to make over to the Justices, as Trustees of the Port, certain lands on the Strand bank north of Armenian Ghât as the security on which it was proposed to raise the required funds. The lands were transferred, but saddled with conditions which were inadmissible, and the Committee of Justices submitted that in their opinion the land in question and the income derived therefrom should be absolutely and entirely appropriated to the improvement of the port. After some discussion this was agreed to by Government, and the lands were taken over by the Justices at an annual rent of Rs. 1,000 per mensem.

Difficulties were also experienced in raising money for constructing the proposed works, particularly from the refusal of the Governor-General in Council to assent to a Bill passed by the Legislative Council of Bengal facilitating the borrowing powers of the Trustees. The reasons for this refusal were that the Port Trust had no powers of local



Bathing Festivals.

taxation, and no present income at all adequate to giving security for such loans as were likely to be required for the projected works, and that consequently the Government of India must contemplate "the possibility at all events of the whole of the financial engagements of the Trust being at any time forced upon it."

This difficulty could not be overcome, and led to the collapse of the River Trust. The Government of India, however, offered to advance money for the works on certain conditions, *viz.*, "that the designs and estimates for all works proposed to be executed should be sent up for the approval of the Government of India and for execution on the footing of ordinary public works under the direction of the Lieutenant-Governor, or, if His Honour desired it, and the Port Committee assented, by the agency of the Trustees." The Sub-Committee declined to work under such restrictions, and the whole of the plans, etc., were handed over to Government. Mr. Leonard's services were replaced at the disposal of Government, and the Strand bank lands were taken over by the Commissioner of Police on behalf of Government. Altogether sixteen months elapsed between the time when the Act was first brought into operation and the date when the Trustees abandoned their Trust. Beyond the appointment of Mr. Leonard as engineer, who reported upon the best means of improving the river bank, nothing whatever was done, there being no funds with which to carry out his recommendations.

The Government of Bengal now took the matter up, and promised to give early attention to the reconstruction of a River Trust on a sounder basis, commencing, in the meantime, through the Public Works Department, the works for the improvement of the port which had been recommended by Mr. Leonard when engineer to the Sub-Committee of Justices. In 1869, when these works were nearly completed, a short Act (IV of 1869) was passed as a temporary measure, vesting the powers which Act X of 1866 had conferred on the Justices of Calcutta in the Secretary of State, and in February 1870 a Bill for the Improvement of the Port was introduced into Council, which became Act V of 1870—the Act under which the present Commission was initiated.

In framing this Act, the principles laid down by the Government of India in 1863 were adopted, and the only important objection which was urged against the Bill, as first introduced, was that, instead of providing a Trust which should have, as originally suggested by the Government of India, entire jurisdiction over the port and its approaches, from the Sandheads to the northern boundary, the new measure, like Act X of 1866, limited the action of the Trustees to the river bank and to the construction of wharves and jetties thereon. This narrowing of the scope of the Bill was objected to by the mercantile community, and provision was in consequence made for the transfer to the Commissioners, at any time subsequent to the passing of the Act, of such of the powers

of the Conservator of the Port under Act XXII of 1855, as the Government of Bengal, with the sanction of the Government of India, might be pleased to transfer, and the Commissioners be willing to accept.

Act V of 1870 received the assent of His Excellency the Governor-General in Council on the 12th August 1870, and came into operation on the 17th October following, when nine gentlemen were appointed "Commissioners for making Improvements in the Port of Calcutta," of whom the name of the Chairman, Mr. V. H. Schalch, is still commemorated in the street of that name, and that of another civilian member, Mr. S. S. Hogg, in the Stuart Hogg Market. The Vice-Chairman, Mr. W. D. Bruce, was the first executive head of the Trust, and occupied the post until his retirement in 1889. The number of Commissioners constituting the full Board has undergone several changes since 1870; by the first Amending Act passed in the following year it was increased to 12, by another Act passed in 1881 to 13; it remained at this figure till 1887 when a partially elective system (four Commissioners to be elected by the Chamber of Commerce, one by the Trades Association and one by the Corporation) was substituted for the former system of nomination by Government of the whole number; it was further increased by an Amending Act of 1890 to 15, and by another Act passed in 1905 to 16, at which it now stands. The present number is composed of 7 appointed or nominated and 9 elected Commissioners; the Government of Bengal appoints the Chairman, approves the appointment by the Commissioners of the Deputy-Chairman, and nominates five other Commissioners, usually the heads of the three railway systems serving Calcutta, the Collector of Customs and the Superintendent of the Royal Indian Marine Dockyard; the Chamber of Commerce elect 6, the Trades Association 1, the Corporation 1, and 1 is chosen by a body representing the interests of the Indian mercantile community. Up to 1920, the Chairman (usually the Member in charge of the Board of Revenue), besides presiding at all ordinary or Committee meetings, exercised general powers of supervision, but the working head of the administration was the Vice-Chairman. During the year 1919, the Commissioners decided to ask for the appointment of a whole-time Chairman as head of the administration, and the necessary "Amending Bill" became law in 1920.

In other respects the Act of 1870 has undergone many alterations and received many additions; the most important of these were those comprised in Act II of 1885, which were consequential on the decision to construct a system of Wet Dock at Kidderpore. By 1890 the Amending Acts numbered seven, and the consideration of a further number of alterations led to the passing in 1890 of a new Consolidating Act (Act III of 1890), which is now in force. Since 1890 there have been twelve further amendments enacted; the most important of these gave authority to construct tramways, afterwards called railways, for the conveyance of passengers and goods; power to levy a general or differential tax (now called the River-due); power to build vessels for carrying passengers (the legal basis of the Commissioners' ferry service); authority to issue debentures

for periods not exceeding 60 years in place of 30 years; to grant pensions or gratuities to relatives of employees killed or injured in the execution of their duty; to execute new works costing not more than Rs. 2 lakhs (as compared with the former limit of Rs. 50,000) and works in excess of this limit with the sanction of the local Government.

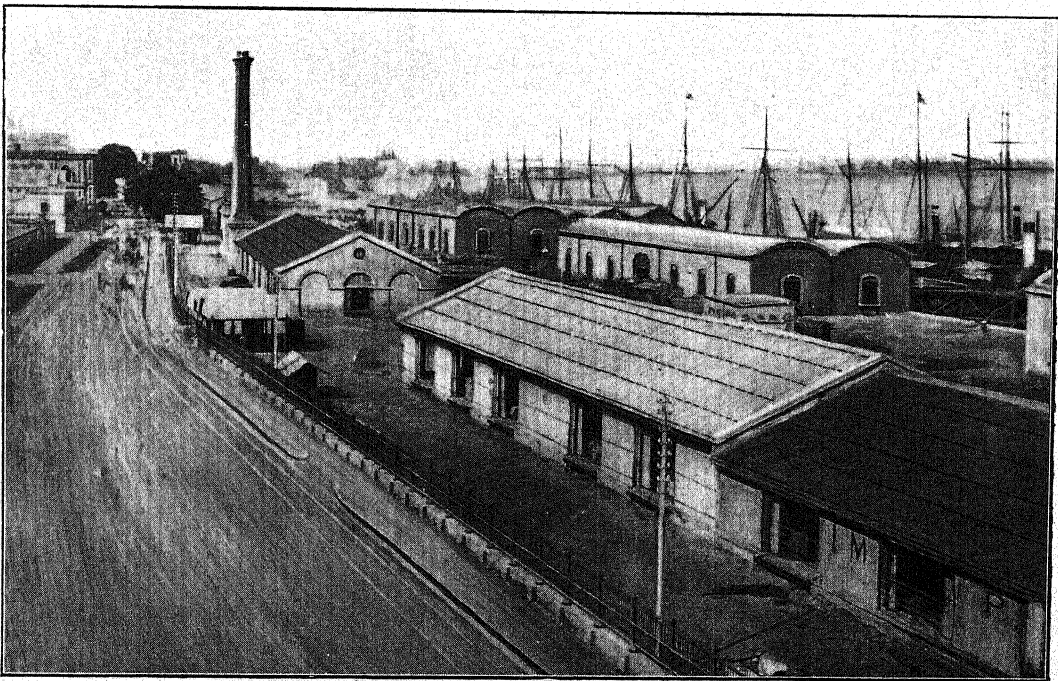
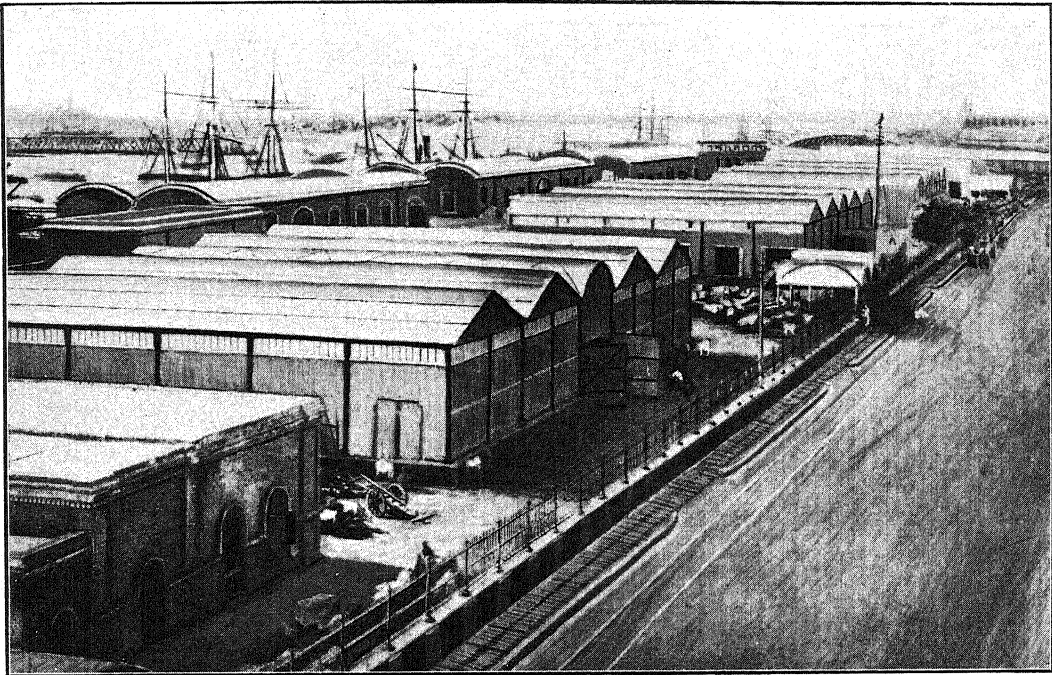


PROVISION OF PORT FACILITIES.

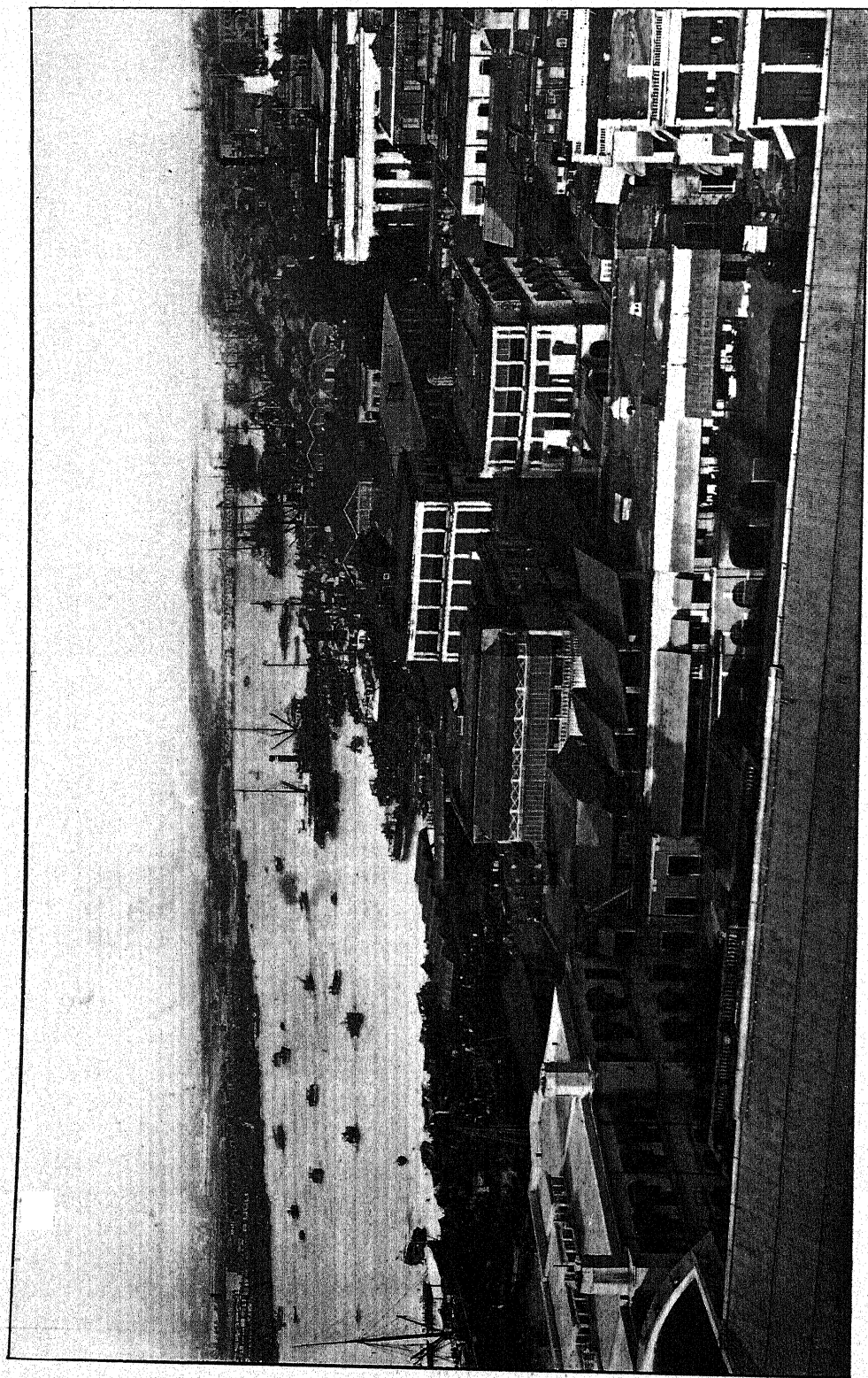
At the inception of the Trust in 1870 practically the whole burden of work had still to be undertaken. There had been a great deal of discussion, particularly after events such as the gale of 1842 and the cyclone of 1864 with their attendant loss of life and serious damage to property, but the history of port improvements, in the sense of appliances to facilitate the trade of the port, was only one of projects and commissions of enquiry thereon. Much had been proposed, but nothing done. The construction of wet docks was, for many years, the favourite means by which it was proposed to improve the port of Calcutta. Towards the close of the 18th century, General Watson founded a marine yard at Kidderpore, and obtained a grant of land from the King and the East India Company for docking purposes. He designed and actually commenced in 1781 the construction of wet docks between Tolly's Nullah and Kidderpore. To carry out his design General Watson went to the length of diverting the nullah from its old course, but the work—the only attempt actually made in the course of seventy years to “improve the port”—was left uncompleted after General Watson had expended upon it and upon works connected with a dry dock and a shipbuilding yard, on the site of what is now the Government Dockyard, £100,000 of his own fortune.

In 1824 Major Schalch produced a plan differing widely in design from that of General Watson, but having the same object in view, *viz.*, the construction of wet docks in Tolly's Nullah. This plan was referred to a Committee appointed by Government to consider and report upon the subject of providing wet docks, but the Burmese war caused the adjournment of the Committee, and it never again re-assembled. To this Committee of 1824 was also referred a scheme projected by Mr. Colvin for a dock between Meerbhur Ghât and Nimtollah, which shared a similar fate.

In 1831 a survey was made by order of the Government of India with a view to the excavation of a canal from Calcutta to the head of the Mutlah River. This proposal for a canal was revived at various times, but was postponed in consequence of the



The Jetties in the "Eighties."



The Jetties in the "Nineties."

construction by the Calcutta and South-Eastern Railway in 1862-63 of a railway to Canning Town and later was finally abandoned in consequence of the deterioration of the Mutlah River.

The great hurricane of June 1842 caused a disastrous loss of life and property among the shipping lying in the port, and led to the appointment of a Committee to consider the best means of guarding against the recurrence of a similar calamity. This Committee, the President of which was Lt.-Col. Forbes, Bengal Engineer, in a report submitted to Government in May 1846, recommended the construction of wet docks at Kidderpore, which were to provide, at a cost of about Rs. 50 lakhs, for 200 vessels, per annum, of an average burthen of 400 tons. Plans were prepared, the lands valued, estimates of the cost of construction made, and the question of ways and means fully discussed, the Committee recommending the immediate execution of the design by means of funds to be raised by a Joint Stock Committee, in which Government should be a large shareholder. In acknowledging the receipt of this report, the Deputy Governor of Bengal expressed a wish that the desire of Government to encourage the work, and the satisfaction felt at the association of a large number of the influential and wealthy members of the mercantile community with the project, should be made known to the public. This was done, but the labours of the Committee ceased and the scheme collapsed. In 1847 an endeavour was made to float a company with a capital of £1,000,000 for the construction of a line of railway to Diamond Harbour with warehouses and wet docks. The project fell through, as Government declined to give a guarantee of interest, and the success of railways in India had still to be demonstrated.

After another interval of ten years the question was again brought forward by two Engineers, Messrs. Henderson and Greaves, who, in a letter addressed to the Marquis of Dalhousie, then Governor-General, discussed the whole question of the trade of the port, the condition of the channels of the Hooghly River leading to the port, the advisability of constructing wet docks for the accommodation of the trade, and of a steam floating ferry bridge between Calcutta and Howrah. The site proposed for the wet docks was Howrah, between the present site of the East Indian Railway terminus and Sulkeah. At this time a scheme was being matured to make the Mutlah River the port for a portion of the trade of Bengal; this proposal was actually adopted by Government, the river being buoyed off and the place declared a port. In this way, probably, attention was gain diverted from the necessity of making improvements in the port of Calcutta.

In 1861 Messrs. Anderson, Fergusson and Henfry submitted a project to Government for the construction of jetties upon designs similar to those which had been adopted by Government. This scheme, which involved the construction of eight jetties (afterwards

extended to eleven), was referred to a Committee for consideration and report. The Committee had also under consideration a design by Mr. Bradford Leslie for a continuous wharf wall from Clive Ghât to Chandpal Ghât, and, after weighing the comparative advantages of both schemes, arrived at the conclusion that, while both were feasible, the screw-pile jetties offered the readiest means of supplying the wants of the port, and recommended that instead of conceding any rights in the foreshore to private individuals, the works should be undertaken and carried out by a public body, subject to public control and supervision. Acting upon the report of this Committee, the first steps were taken in 1863 for the formation of a River Trust. In the meantime several other projects had entered the field. One, which obtained the support of the Bengal Chamber, for the construction of wet docks on the Howrah side was put forward by Mr. Franklin Prestage, then Chief Engineer of the Eastern Bengal Railway Company; another but connected proposal was laid before Government by Mr. Power, the Chief Engineer of the East Indian Railway Company and Mr. Leith, Chairman of the Eastern Bengal Railway Company, who represented, respectively, the Calcutta Victoria Dock Company, Ltd., and the Calcutta Wet Docks and Wharves Company, Ltd.

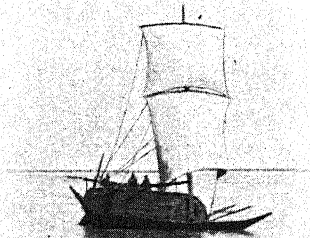
Another calamity—the great cyclone of 1864—imperatively drew attention to the subject, and again a Committee was appointed to consider principally the character of the moorings provided in the port; plans were produced and discussed for providing other appliances, a continuous line of jetties being again proposed by Colonel Fraser to meet the growing wants of the trade. The suggestions of this Committee are of interest in that they led to the establishment of the present system of moorings in Calcutta.

The history of projected improvements has thus been traced to the year 1866, when Mr. Leonard, who had been appointed engineer to the Trustees for making improvements in the port, under Act X of 1866, collected information and reported upon what would be the best means of providing appliances for the convenience of the trade. The Trust abandoned by the Justices was, as stated above, resumed temporarily by the Government at the end of 1867, and the engineer's report was at once acted upon. Orders were issued, in the beginning of 1868, for the construction of four screw-pile jetties with cranes and sheds for the accommodation of the sea-going trade, and a contract was entered into with Messrs. Marrillier and Edwards to complete these works by August 1869 at a cost of five lakhs of rupees. They were not, however, completed until October 1869, since when the "Jetties" have been in operation.

At the same time an estimate for the reclamation of the land between the Mint and Aheerettollah Ghât, and the construction thereon of a riverside road and wharf, for the convenience of the inland trade, was sanctioned. This work was completed in August 1870, when the Government, under the provisions of Act X of 1866, the powers of

which Act had been vested in the Secretary of State by Act IV of 1869, imposed a toll of 1 anna 10 pies per ton on all inland vessels using the wharf.

From this point the development of the port identifies itself largely with the development of the jetties and, later, of the docks.



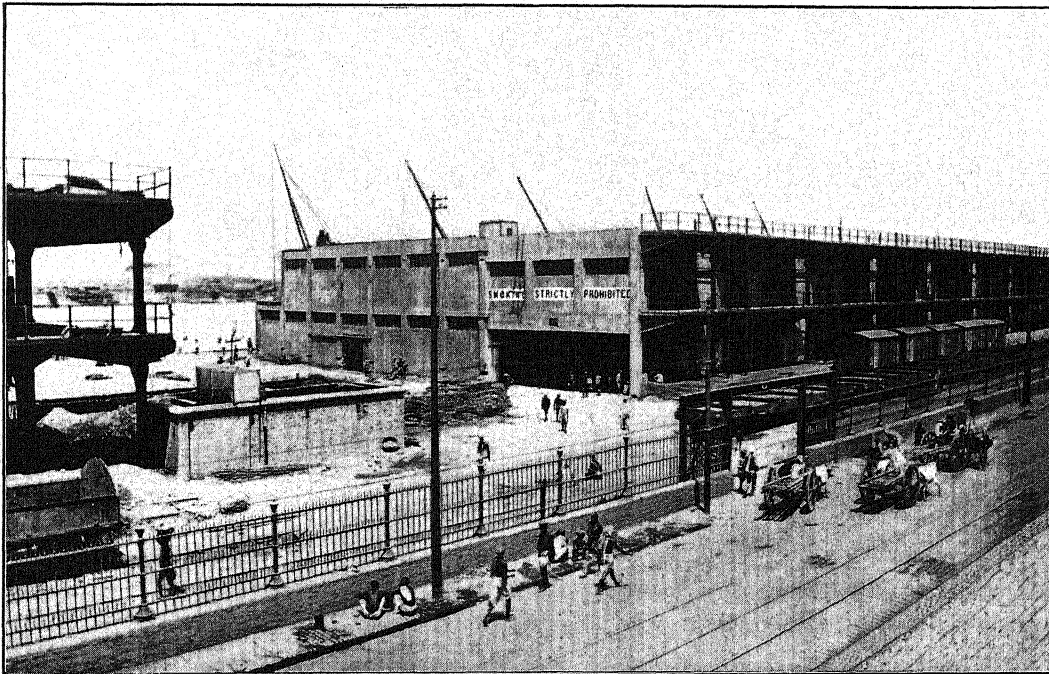
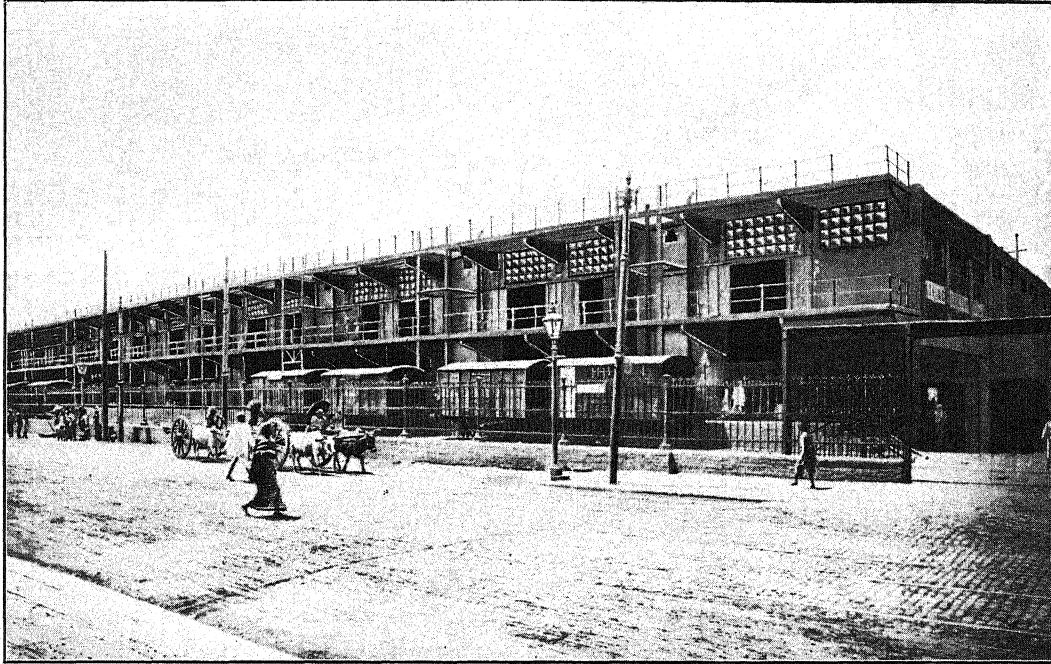
THE JETTIES.

DURING the time the jetties and inland vessels wharf were worked by Government, they were placed under the control of the Collector of Customs ; many obstacles had to be overcome and a great deal of work done in arranging for the realization of charges, the regulation of the discharge of vessels, the storage and delivery of goods : in fact, the organization of the whole establishment for the working of an entirely new department. All this was successfully accomplished by Mr. Crawford, the Collector of Customs, who, in addition to his regular duties, initiated and carried on the working of the jetties from November 1869, when they were completed, until October 1870, when they were transferred to the Commissioners. It was the experience acquired during this period which enabled the Commissioners to draw up, with the assistance of the Collector, the regulations under which the work at the jetties has since been carried on. The working of the cranes and the construction and maintenance of buildings was under the charge of the Executive Engineer, Hooghly River Division.

In 1869 orders were given for the construction of two more screw-pile jetties with sheds, and these works were in progress at the date of the transfer to the Commissioners of the Trust.

Thus, when the Port Trust commenced operations, it had four screw-pile jetties, fitted with steam-cranes and sheds, at a total cost of Rs. 5.33 lakhs, actually in operation, and two more under construction on which Rs. 1.34 lakhs had been spent ; also a wharf for inland vessels, offices and minor works which had cost altogether about another lakh of rupees. The Commissioners were debited with a capital sum of Rs. 10,00,000, repayable in ten triennial instalments and upon which interest, at $4\frac{1}{2}$ per cent., was payable under the provisions of the Act. For the Rs. 10,00,000 debited to them, they received from Government, on the 17th October 1870, the works specified and cash balances aggregating Rs. 2,14,402.

During the six months from October 1870 to March 1871, 52 vessels with a total tonnage of 47,774 tons were accommodated at the four completed jetties, the amount received from them aggregated Rs. 1,03,763 and the average number of days each ship occupied her berth was 11.3. This was for discharge only, the Commissioners not being then in a position to undertake loading. The agents of one ship, the "Bowfell," contended



The New Jetties—On Completion.

that the Commissioners were not empowered to place a ship at their jetties unless they were prepared to load as well as to discharge her, and, their contention being supported by the Advocate-General, an Amending Act was found necessary.

During the first complete year of working, 1871-72, when the jetties—then six in number—accommodated 143 vessels with a nett tonnage of 222,446 tons and receipts of Rs. 3,63,145, it was found necessary to double the size of the sheds, to build sheds for the two additional jetties, to extend the jetty heads (which had originally been short T-headed structures) and finally to connect the extended jetties into one continuous wharf at a cost of Rs. 5½ lakhs.

The traffic handled grew steadily and rapidly. The report for the year 1879-80 shows that eight jetty berths had been completed, at three of which cargo could be delivered direct from vessel to shed, and hydraulic cranes were in process of substitution for the old steam-cranes. The number of vessels had risen to 192 with a nett tonnage of 315,263 tons and receipts of Rs. 6,56,409.

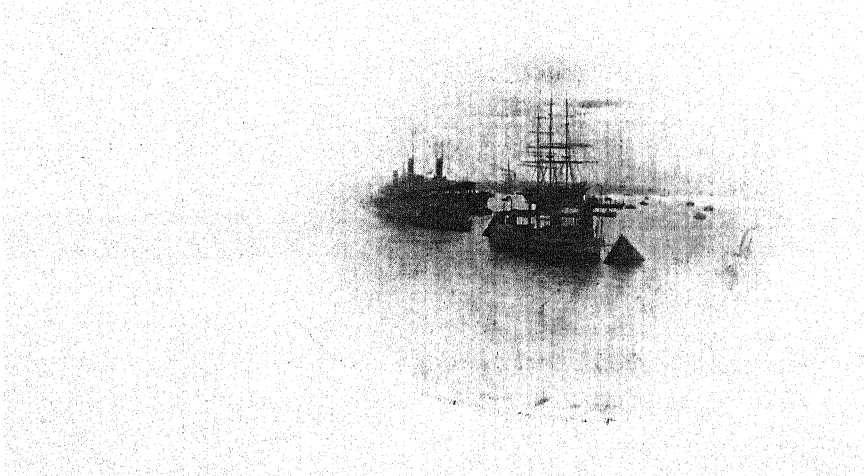
In 1889-90, at the end of another ten years, there were still eight jetties in use ; the number of vessels accommodated showed a slight further increase to 203, the nett tonnage to 419,026 tons and the receipts to Rs. 9,04,905, but during the last seven years of this decade the number of ships and their tonnage was more or less stationary.

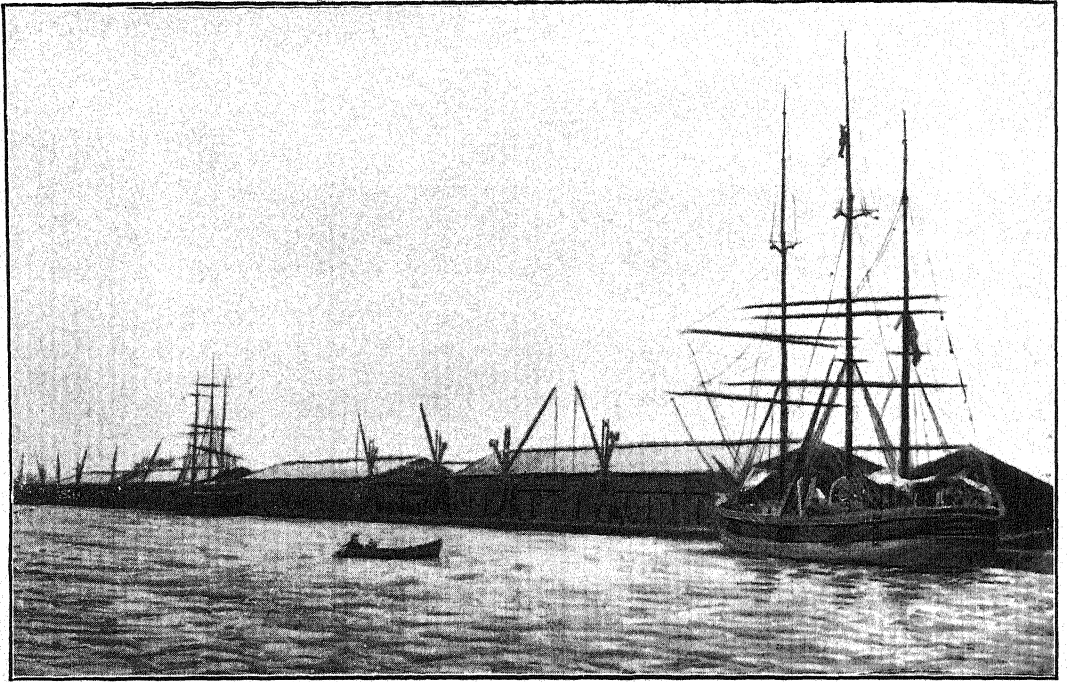
In the year 1897-98 it had been found necessary to rearrange the moorings and jetty berths in order to cope with the rapidly increasing size of steamers, with the result that the number of berths had been reduced from eight to six. Thus at the end of the third decade, in 1899-1900, with six berths available, the number of vessels berthed at the jetties remained at practically the same figure, *viz.*, 204, but their tonnage had increased to 538,847 nett tons and the earnings to Rs. 11,87,650.

During the fourth decade, from 1900-10, No. 2 jetty and shed were entirely re-built on modern lines, the new shed being a large double-storied structure with an ample covered roadway on its east side, and in the same year the construction of two additional jetties of a modern type towards the south was decided upon. The first of these, No. 7, was completed in July 1907, and the second, No. 8, in November 1908. On the other hand, the gradual movement of the deep channel to a point somewhat lower on the Calcutta side, combined with the increasing depth of steamers, had made the continued use of No. 1 jetty for the berthing of ocean-going steamers impracticable, and it was given up for the use of the coasting trade, their steamers continuing to be berthed in the stream and the goods removed to and from No. 1 jetty in boats. In the financial year 1909-10 a total of 297 vessels were accommodated at the jetties, having a nett tonnage of 1,019,609 tons, and the total receipts were Rs. 13,78,667.

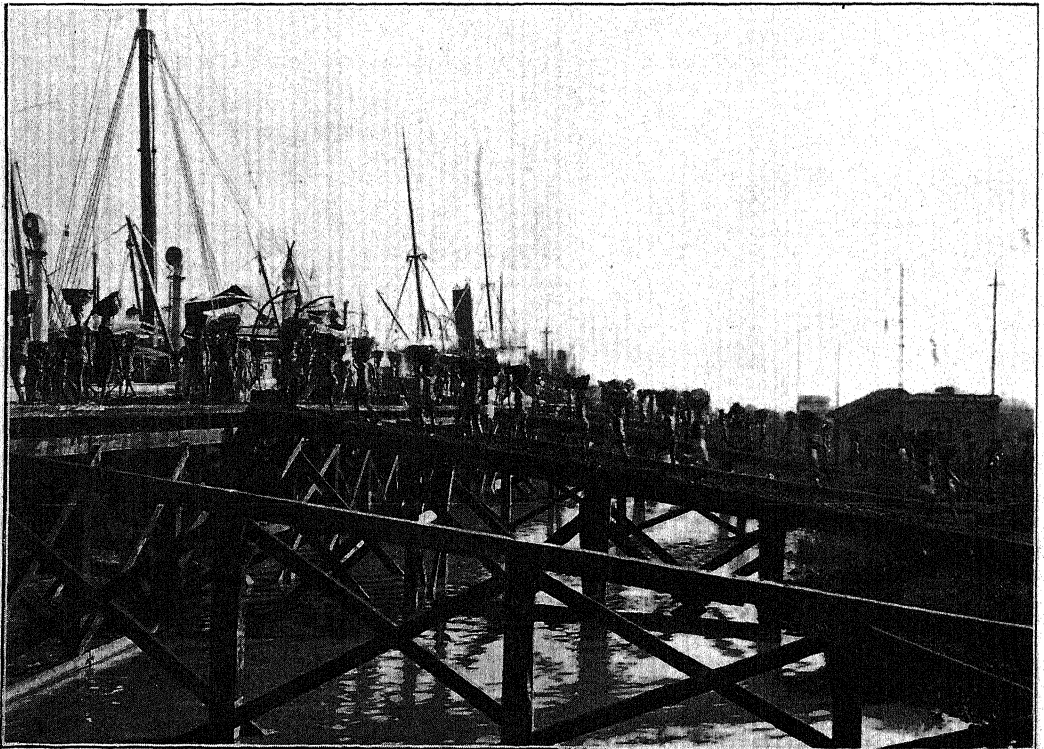
The outbreak of war in August 1914 necessarily caused a serious and lengthy hiatus in the scheme of development. The tonnage of goods handled at the jetties, which in the year 1913-14 had reached the maximum figure yet attained of 1,186,797 tons, fell to 917,978 tons in 1914-15, to 788,431 tons in 1915-16, 686,010 tons in 1916-17, 633,693 tons in 1917-18, and 574,833 tons in 1918-19. These latter figures were, of course, well within the capacity of the jetties available, although No. 3 had developed signs of weakness, and had been thrown out of commission early in 1916, its reconstruction being deferred until after the war, while in the meantime one additional jetty on the south, No. 9, had been completed and brought into use in 1914. The after-war recovery has been found, owing to the shortage of tonnage and labour troubles, to have been taking longer than was anticipated, but the year 1919-20 saw the turning point, the tonnage handled at the jetties for that year having been 713,746 tons, with a marked and increasing tendency to improvement during the later months of the year. The first few months of 1920-21 have shown indications of an import trade comparable to that of the period immediately preceding the war, and the unusual proportion of heavy iron and steel and machinery which ships are now bringing are throwing a heavy strain upon the capacity of the seven berths available.

Thus, at the time of compilation of this book, the Calcutta jetties are in a transitional stage ; they must be utilized to the full for the foreign import trade pending the completion of the four berths at Garden Reach, to which reference will be made later, and the construction of the first section of the King George's Dock, but, having regard to the intention of transferring this trade to Garden Reach as soon as possible, no further expenditure of an important kind is contemplated, as the berths in their present form will provide ample accommodation for the coasting trade to which they will ultimately be made over.





Kidderpore Docks—First Vessel Entering.



Coolies Loading Coal.

THE KIDDERPORE DOCKS.

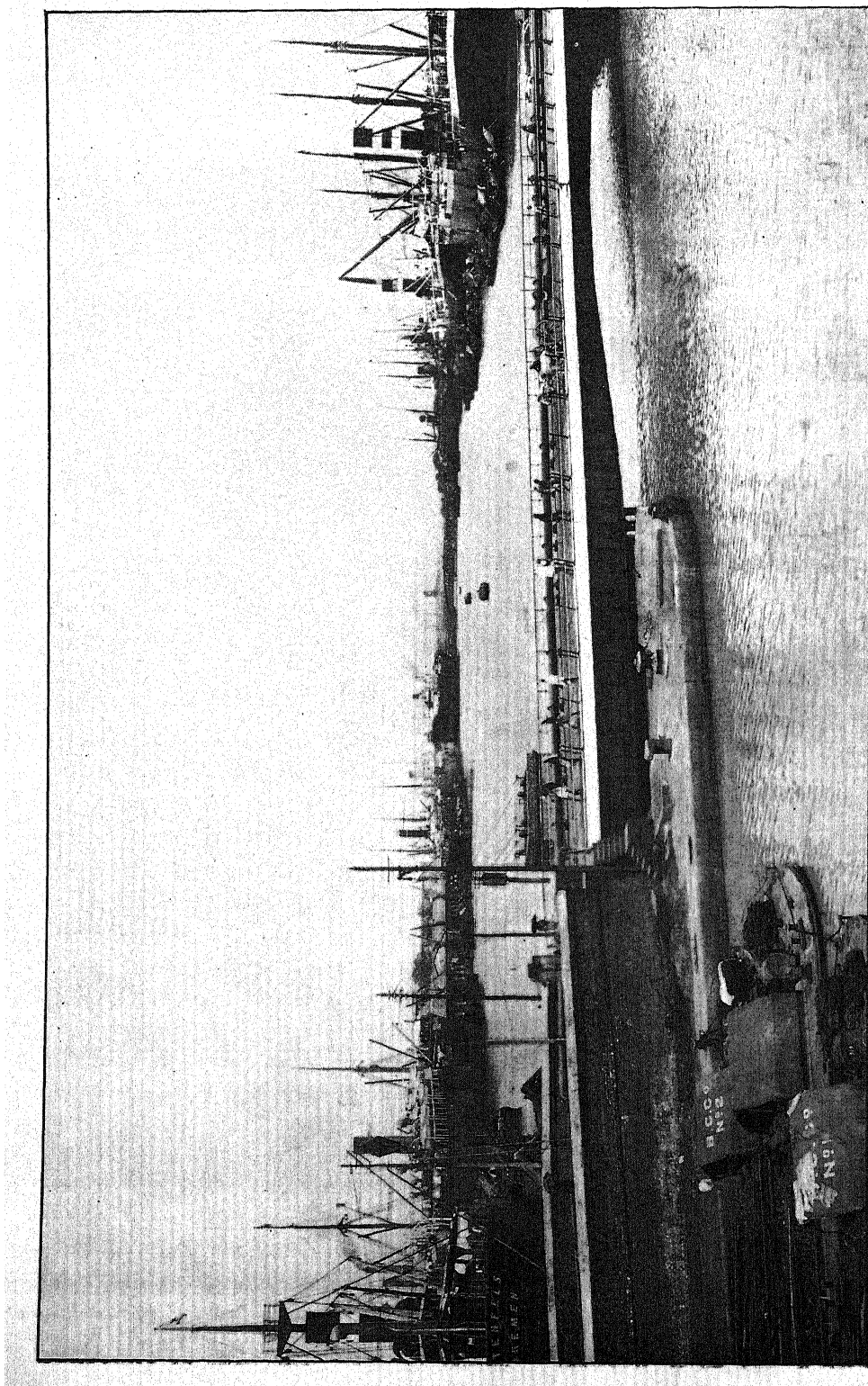
REFERENCE has been made above, when describing the first formation of the Trust, to a number of schemes for the accommodation of the sea-borne trade of Calcutta in wet docks, which were rightly regarded as offering greater security from damage during violent storms.* After the Trust commenced work in 1869 no such proposal was revived until the year 1881. In that year the Secretary of State sanctioned the construction of a branch line to Diamond Harbour, to be known as the Calcutta and South-Eastern Railway, and, in according approval, he ordered the formation of a Committee to consider the construction of wet docks at Diamond Harbour, to be worked in connection with the railway. This Committee, which sat from January to May 1882, comprised Mr. Reynolds, the Chairman of the Port Commissioners, the Secretary and Joint Secretary to the Government of Bengal in the Public Works Department, the Agent of the East Indian Railway, Messrs. Steel and Morrison representing the commercial community, and an engineer brought out from England, Mr. C. Wawn. The terms of reference included the risks and delay to ships then navigating above Diamond Harbour, the consideration of the extent to which these could be avoided by the use of docks located there, the economy in charges expected, the general design of the docks and the prospects of a remunerative return, or, in the event of the dock scheme not being recommended, the construction of less important works, such as coal wharves and passenger jetties, which could be recommended for execution. In the exhaustive and elaborate report submitted (which included detailed estimates of the scheme), the official members of the Committee, including Mr. Bradford Leslie, the Agent of the East Indian Railway, expressed the opinion that wet docks should be constructed and that they should be situated at Diamond Harbour, though they recognised and dealt with the objection raised by the representatives of the commercial community against this site; and expressed the opinion that the docks would assuredly be financially successful, provided their assumptions proved correct, *viz.*, that they would cost not more than Rs. 150 lakhs to construct, the annual working cost would not exceed Rs. 7½ lakhs, and that they would be used by at least 468 vessels paying an average of Rs. 1,600 each. The two representatives of the commercial community, *viz.*, Mr. Keswick (who had replaced Mr. Steel) and Mr. Morrison, recorded minutes of dissent; the former advocated further investigation of the possibility of additional accommodation being provided in Calcutta or just below it; the latter questioned the wisdom of spending further large sums on docks or other appliances having access to the sea only through the Hooghly, until the construction of the ship canal to the Mutlah River, proposed by Mr. Duff-Bruce,

* The cyclone of 1864 is said to have cost the P. and O. Company alone more than £100,000 in damages to their ships.

had been carried out. In expressing these views, both appear to have been much impressed by the inconvenience and loss to the trade of Calcutta expected from the institution of a distinct auxiliary port at some distance from the city ; they feared not only the duplication of staff and the inconvenience and difficulty of supervising operations which were being carried out in some distance from their head offices, but they pointed cogently to the fact that the operations of import and export trade could not be carried out at both places ; either the economy expected by the Diamond Harbour scheme would not be realised, in which case few ships would wish to go there, or, if it were realised, all vessels would prefer Diamond Harbour and there would be a heavy loss to property owners in Calcutta, including the Port Trust itself, which had embarked large capital sums in the facilities already provided.

Mr. Morrison's views indicate the importance then attached to the various proposals for utilizing the River Mutlah, either by the construction there of an auxiliary port or by a canal thence to the neighbourhood of Calcutta. The " Port Canning " scheme had already taken shape ; the line of railway from Calcutta to Port Canning had been completed in 1863 and the construction of a number of jetties and sheds finished somewhat later, though so far no great use had been made of them. The opinion was still widely held that as a navigable channel the Mutlah was superior to the Hooghly, though it seems strange that such a channel—destitute of the head-water supply which is enjoyed by the Hooghly, and to which modern expert opinion attaches so much importance—should ever have been expected to provide a permanent approach. In 1883-84 it was thought advisable to make a detailed survey and this was carried out by Capt. Petley. He speaks of Port Canning town being in a most dilapidated condition, all the brick buildings, except three dwelling-houses, exclusive of the railway station, cutchery and rice mills, having gone to ruin. The five jetties were worn out, the boat dock overgrown and the tramway sadly in need of repairs. As to the Channels, he found one giving 25 ft., but the other was only 9 ft. at low water ; nevertheless, he concluded by saying that with the Channels properly lighted and buoyed, masters of ships, with ordinary care, and providing that the weather was fairly clear, might very safely take their vessels most of the way without the aid of a pilot. The proposal met with a lingering death ; the southern portion of the Kidderpore Docks—known as No. 2 or the coal docks—owes the " kink " in its alignment to the idea that ultimately it might be linked up with the Mutlah River by a canal, and the writer remembers that as late as his arrival in Calcutta in 1900 he read a recently submitted report on the then condition of the river, which sounded the death-knell of the scheme.

To revert to the dock enquiry, the Lieutenant-Governor, Sir Rivers Thompson, reviewing in February 1883 the position created by the divergence of opinion regarding Diamond Harbour, suggested that the Port Commissioners should, in communication with the Bengal Chamber of Commerce, institute a further enquiry as to the measures possible for extending the present accommodation of the port and their cost. A month later the Government of India concurred in this action, but extended the enquiry to



Kidderpore Docks—Looking North.

embrace the feasibility and cost of a wet dock of reasonable size but capable of enlargement, and the expediency of the Commissioners themselves for carrying out the project by capital to be raised by them for the purpose. It was suggested also that this Committee should consider earlier projects of a similar nature, *viz.*, that of Col. Forbes, to form a wet dock at Kidderpore, that of Messrs. Prestage, Power and Leith, and that of Lt. Stiffe and others for docks at Akra. The Port Commissioners thereupon appointed as their representative their Chairman and Vice-Chairman, Mr. Prestage, Agent, Eastern Bengal Railway, Mr. Alexander, of Messrs. Mackinnon, Mackenzie & Co., and Mr. Keswick, of Messrs. Jardine Skinner & Co., while the Chamber of Commerce nominated their President, the Hon'ble R. Miller, Mr. Turner, of Turner Morrison & Co., and Mr. Stevenson, of Graham & Co. This joint Committee commenced its sittings in April 1883, completed them in September of the same year and reported in the same month.

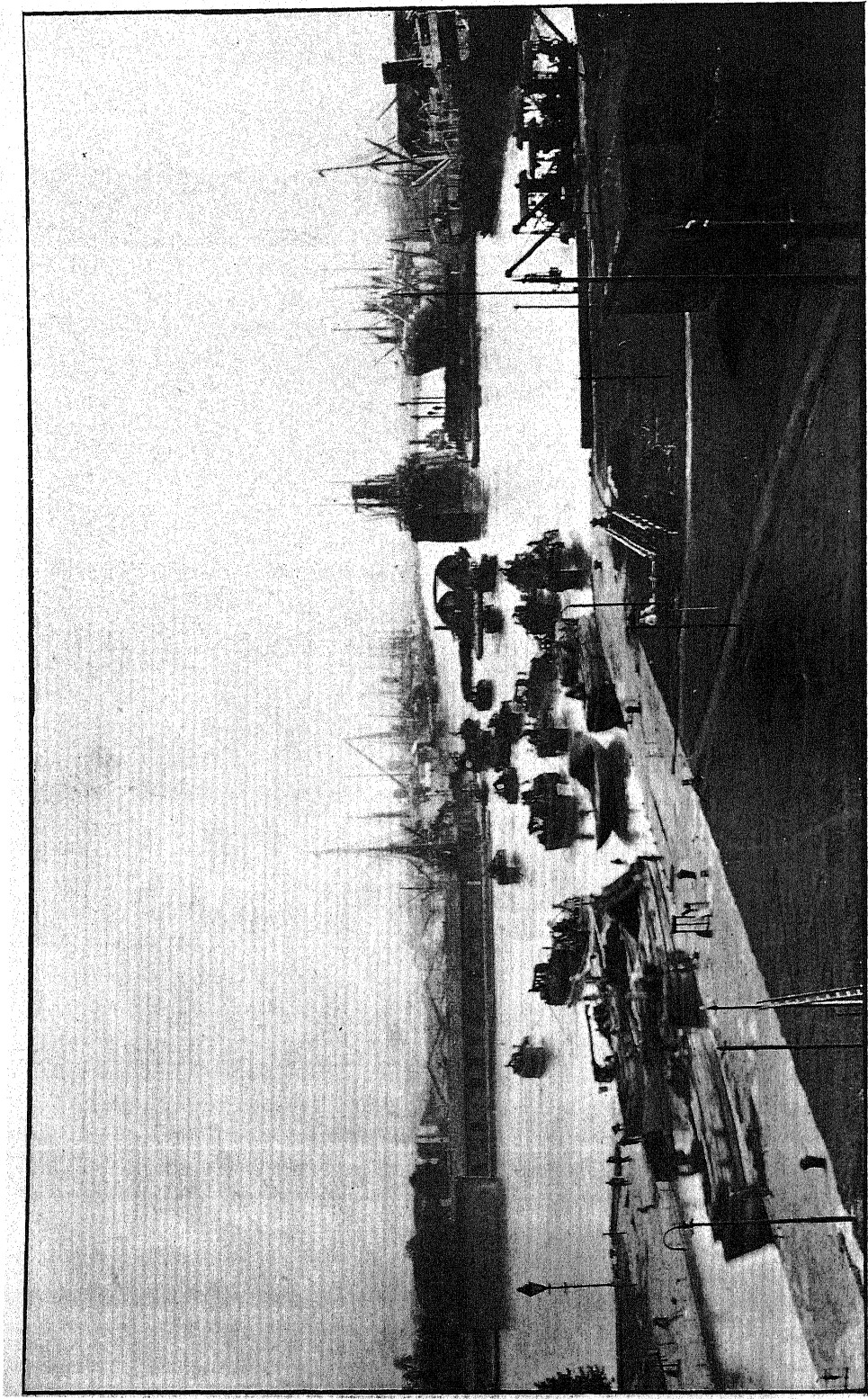
They commenced by a careful analysis of the commerce of Calcutta as they then found it. They pointed to the progressive increase in the tonnage visiting the port in both the import and export trades, the growth of downwards traffic on the East Indian Railway—nearly one-half of which comprised goods exported by sea from Calcutta—a similar growth of traffic on the Eastern Bengal Railway and on the canals and river. They paid special attention to trade practices in force with the chief export staples, showed that direct shipment was difficult if not impossible and that the chief advantage claimed for the Diamond Harbour scheme would therefore not be realized. The Commissioners' jetties were fully occupied in handling the general import trade and neither salt ships nor export vessels could obtain accommodation but had to lie in the stream and discharge or take their cargo by boat. As regards jetty accommodation, the Committee considered that, if any extensions were to be provided for the import trade, this should be limited to two jetties placed on the south of No. 8 jetty, but deprecated such expenditure unless the dock scheme were seriously delayed. As their main recommendation they proposed the construction of a wet dock at Kidderpore with two entrances to be made through the Government Dockyard, together with an extension of railway accommodation and the provision of further wharves and warehouses. In arriving at this view they rejected the two proposals for docks at Akra, as they found that this site was peculiarly unsuitable for the docking of ships, the then Deputy Conservator, Lt. Petley, remarking that the site suggested was one of the last places he would have chosen in the whole length of the river. They found a general unanimity that any dock constructed should be on the Calcutta side and they regarded the completion of the Railway Bridge enabling the East Indian Railway to work into such a dock as likely to concentrate there both the import and export trade. They furnished full details of the scheme proposed by Mr. Duff-Bruce, estimating that with an expenditure of Rs. 2.31 lakhs on the dock and on the extension of the tramway from the jetties, the Port Trust would have to meet an annual expenditure of Rs. 11.26 lakhs against receipts of Rs. 25.24 lakhs, thus leaving available for fixed charges a balance of Rs. 13.98 lakhs, sufficient to meet interest but not sinking fund charges on the cost of the dock. With a reasonable increase of trade there would

be a considerable surplus. As regards the proposed ship canal to the Mutlah, they estimated its cost at Rs. 110 lakhs, and the total annual expenditure involved in providing this second entrance to the port at Rs. 8·88 lakhs, which they believed could be met without any great increase in the existing charges. They were of the opinion that the Commissioners could not raise so large a loan as Rs. 2 crores and thought Government should assist either by advancing the capital or guaranteeing the loan.

Mr. Duff-Bruce's scheme was then subjected to prolonged and exhaustive criticism, first by Lt.-Col. J. M. Haywood, R. E., Chief Engineer, Public Works Department, Government of Bengal, who reported favourably, but increased the estimates to Rs. 265 lakhs and favoured the postponement of the Mutlah canal scheme, on the ground that there was no reason to believe that the Hooghly was deteriorating. In October 1883 the scheme was forwarded by the Government of India to the Secretary of State as being financially sound, but with a stipulation that, before any State aid or guarantee was promised, the Commissioners should first satisfy Government that they had used every means in their power to obtain the money from their own resources.

In March 1884 the Secretary of State replied, confirming the Governor-General in his adoption of the Kidderpore site for the proposed dock, and forwarding a memorandum by Mr. A. M. (afterwards Sir Alexander) Rendel on the engineering features of the scheme, in which Mr. Duff-Bruce's proposals were criticised in many respects. Of these the chief were concerned with the depth proposed for the entrances, the supply of water by pumping, the width of the dock, the arrangement of the tidal basin and dry docks, the depth of the monoliths forming the walls of the docks and basin, and the adequacy of the estimates. Finally, Mr. Rendel suggested a smaller scheme with a correspondingly smaller expenditure.

To these criticisms Mr. Duff-Bruce replied at length, maintaining that it would be necessary to ensure the supply of water by using pumps, which would avoid the accumulation of silt, and would obviate the necessity of making the foundations deep as would be required without pumping. He urged that the width of 600 ft. proposed was essential in view of the large boat traffic which formed then, and still forms, so important a feature of the traffic, that the arrangements at the entrance and in the basin had been very carefully considered by expert Marine Officers, and that the depth proposed for the walls was in line with that proposed by Mr. Wawn in the Diamond Harbour scheme and approved by two Chief Engineers of the Province and also by Mr. Bradford Leslie. He pointed out also that if the soil proved to be as unfavourable as Mr. Rendel anticipated, this alone constituted a strong reason against designing the docks on a lower level. As to the adequacy of the estimates, he remained of the opinion that these would prove sufficient, and urged that the whole scheme as submitted was necessary, and that it was inadvisable to curtail it. At this stage the Government of Bengal obtained an opinion from Mr. R. B. Buckley, and also a joint opinion by Col. Brownlow and Mr. Molesworth (afterwards Sir Gouldford) on the points in dispute. Of these further authorities, Mr. Buckley



Kidderoe Docks—Looking South.

agreed with Mr. Rendel that the foundations at the entrance should be carried deeper, but not that the whole system should be constructed as a low level dock ; entirely endorsed Mr. Bruce's view that pumping would not increase the deposit of silt, or that it was unnecessary, pointing out also that Mr. Bruce's plans had the further advantage of ensuring a change of water, while, on Mr. Rendel's scheme, a large proportion would never be changed. He expressed no opinion as to the width of the dock, but supported Mr. Duff-Bruce as regards the design of the basin and the depth of the wall. He expressed some doubt, however, as to the adequacy of the estimates in view of his own experience elsewhere, and thought an increase in the allowance made for contingencies and establishment advisable. Col. Brownlow and Mr. Molesworth also held that the proposed method of feeding the docks by pumping was required to avoid siltation and on sanitary grounds ; they recommended a reduction in width from 600 to 450 ft.; supported Mr. Bruce's design for the basin and entrances, but Mr. Rendel's as regards the depth of foundations, and, in view of Mr. Buckley's figures, advised an allowance of 25 per cent. for contingencies and interest during construction. The scheme was then forwarded to the Government of India with these criticisms and again by the Viceroy to the Secretary of State in August 1884, the Government of India supporting the views of their technical advisers, but increasing the estimates to Rs. 300 lakhs in round figures. The Governor-General then discussed the question of ways and means, pointing out that if the Commissioners were unlikely to get a better rate than $4\frac{1}{2}$ per cent. in India, it would be more economical for them to borrow in England at $3\frac{3}{4}$ per cent. or even a slightly higher rate. In the meantime the Port Commissioners had been authorized by the Government of India to raise a sum not exceeding Rs. 50 lakhs in the Indian market on a Government guarantee. The Secretary of State, in November of the same year, remarked on the serious nature of the enterprise, quoting Mr. Rendel's statement that " no dock had yet been built which had involved so many and serious risks as these," and comparing the cost per foot run of nearly £60 shown in the final estimates with that of £10 to £15 which had been found sufficient in England. The sanction given was therefore restricted on grounds of expediency and economy to the tidal basin and dock No. 1, totalling 46·13 acres out of the 110·88 acres which the whole scheme involved. The increase in depth of 3 ft. urged by Mr. Rendel was advised, the greater width of 600 ft. was accepted, and the necessity of full consideration being given to Mr. Rendel's views on the other points was insisted upon. Mr. Duff-Bruce adhered to his previously expressed views, and was supported by the Port Commissioners to the extent that they decided to submit these views again to Government. The Commissioners, however, accepted the limitation of the scheme when given to understand that on the most cautious estimates the receipts therefrom were expected to amount to Rs. 15·88 lakhs, against charges for interest and working expenses not likely to exceed Rs. 14·35 lakhs. As regards ways and means, they urged that the legislation then pending to enable them to raise loans for the purpose should not include a sinking fund proviso, pointing out that they were in urgent need of funds on other accounts, which they would be unable to raise by means of an unguaranteed loan, and asked that their financial position should receive

the early attention of Government. Finally, the Commissioners were given, in December 1884, an advance of Rs. 15 lakhs bearing interest at $4\frac{1}{2}$ per cent. with which work was at last definitely commenced.

The difficulties which might have been anticipated from embarking on a scheme of this magnitude with no definite expectation of obtaining on suitable terms the large sums required for a period of years were not long in making themselves felt. Before the end of the next financial year, 1884-85, the Commissioners had spent the whole of the 15 lakhs advanced to them and had pledged their credit to the hilt to meet their commitments in connection with the new dock and other works. They then applied to Government for assistance, but were informed that further advances could not be made, and that if they were unable to borrow on their own credit they should consider the necessity of suspending work on the dock. The position was complicated by the fact that the Commissioners' Act, as it then stood, contained no mention of powers to construct docks, to raise loans for that purpose, to levy the tolls required on revenue account or to frame necessary bye-laws and rules; thus additional legislation was necessary, and this was effected in the Amending Act II of 1885, passed in June of that year. The attitude of Government had already evoked a vigorous protest in which the responsibility of Government for the initiation of the work was strongly brought out and, on the Bill becoming law, the Commissioners were authorized to raise a rupee loan of Rs. 75 lakhs, with a guarantee from the Government of India and bearing interest at $4\frac{1}{2}$ per cent. The time was, however, most unfortunate. Great uncertainty existed regarding the exchange value of the rupee, and the tenders invited yielded only a nominal sum of about Rs. 40,200. This serious state of affairs was placed before the local Government and by the Government of India before the Secretary of State, accompanied by a recommendation, that, in the circumstances, Government should raise the money themselves and lend it to the Trust. The Secretary of State agreed, on the understanding that the money was to be borrowed in India and not in England, and that the rate of interest to be charged should be the actual rate paid by Government, with an additional 1 per cent. for a sinking fund. The Commissioners demurred to both of these conditions, and the Secretary of State then agreed to the sinking fund payments being deferred for four years, but this relief was considered insufficient, and the Commissioners asked that the four years should be calculated from the date of completion of the work, to which proposal the Secretary of State eventually agreed.

In the meantime work on the docks had been suspended from March 1885, by which time the total amount disbursed totalled only some Rs. 29 lakhs. In the year following, another Rs. 20 lakhs was spent on excavation, the construction of the tidal basin and dock walls, the tramway and the boat canal, while all the land required was in the Commissioners' possession, including that needed for the tramway from Akra brickfield. In 1887-88 the Commissioners received further advances from the Public Treasury amounting to Rs. 29 $\frac{1}{4}$ lakhs, bringing the total expenditure on the dock to Rs. 84 lakhs, about 37 per cent.

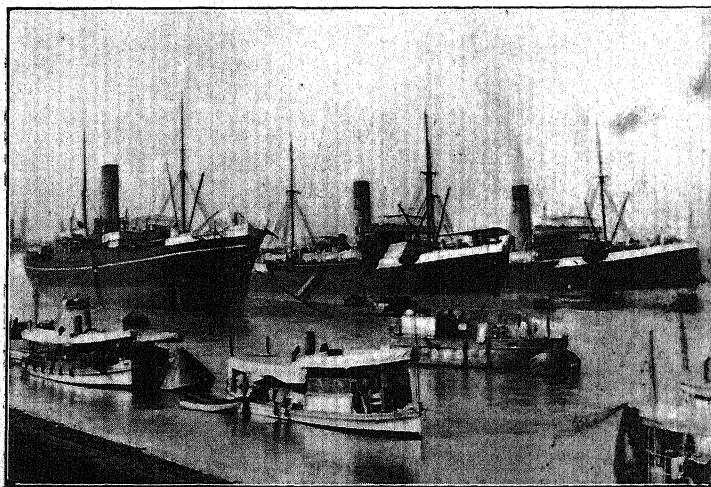
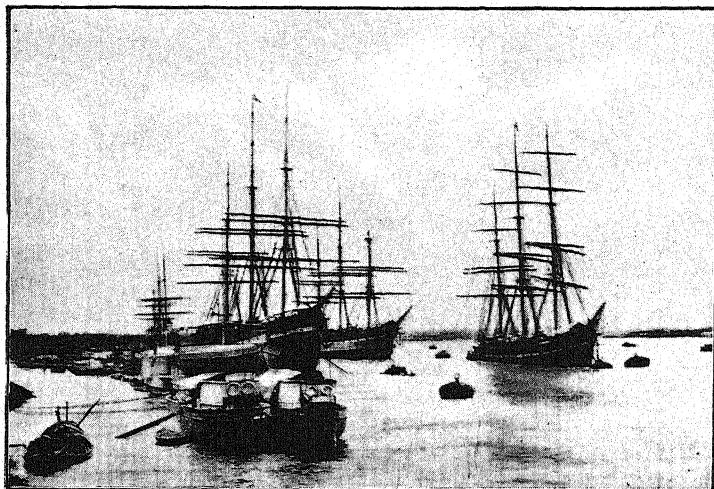
of the estimated total cost of Rs. 227 lakhs. In 1888-89, when a further sum of Rs. 48½ lakhs was spent, the engineers experienced considerable trouble in the construction of the Boat Canal and the Tollygunge Road overbridge owing to the bad soil encountered and the large amount of subsoil water. By 1889-90 the tidal basin had been completed and brought into use, and dock No. 1 was almost finished. Unfortunately at this stage a serious disaster occurred; the berm left along the dock walls had been insufficient, and the walls commenced to slip bodily forward; water was hurriedly led in up to a level of 14 ft. above the Kidderpore Dock sill, and the technical committee, which met at once to consider the matter, decided that it should be raised to 20 in order to prevent further movement, at which level, some 4 feet higher than was intended, the dock water was maintained up till recent years, when the increasing draught of ships led to its being raised by another foot to 21. During the year 1891-92 the new graving dock built for the Royal Indian Marine to replace that which had been removed in the process of constructing the lock entrance was completed, the first vessel, *viz.*, the R. I. M. Boat "Mayo," having been admitted in July of that year. The first of the Port Commissioners' dry docks, that is the smaller one, was finished in October, when the first vessel, the British India Co's. steamship "Lindula," was safely berthed. The erection of the dock shed was also commenced in June 1891 and was carried out as rapidly as the arrival of material from England permitted. During 1892-93 No. 1 dock was completed at a total cost of some Rs. 2·61 crores; the first vessel to enter was the Barque "Luise" which was admitted on the 21st June 1892, followed a few days later by the Anchor Line steamship, "Bohemia."

The main object of constructing the Kidderpore Dock was, as already indicated, to provide suitable accommodation for the export trade, but, with the conservatism which has always characterized the trade of Calcutta, the commercial community hesitated on its completion to take advantage of the facilities which had been provided and continued to load their ships in the river. During the portion of the year 1892-93 for which the docks were open, some 60 vessels entered and 56 left, but the dock was chiefly used either for vessels put back on account of accidents, or laid up because of the depression in freights which then existed. During the year following, only 39 vessels entered the dock, out of which number 24 arrived in ballast to load exports, sixteen taking cargoes of coal and eleven of jute, and the total amount of cargo landed was 29,113 tons, and of that shipped 81,160 tons. When it is remembered that, within recent years, this same dock has accommodated for the general export trade alone over 450 vessels and loaded over 1½ million tons, it will be seen how utterly inadequate was the use first made of the facilities provided with such trouble and expense. The natural result was that the receipts were far short of expectations, amounting only to Rs. 2,21,937, against which expenditure had been incurred to the extent of Rs. 15,04,288, of which the interest charges amounted to Rs. 11,33,126. The year 1894-95 showed some improvement; and during the next few years the export of coal began to assume large proportions; the figure for 1893-94 was almost nominal—4,282 tons—but by 1895-96 it had increased to 105,842 tons, and in

1898-99 to 877,895 tons. In wheat and seeds also there were striking developments : the export in 1893-94 had been only 400 tons—but that for 1898-99 was 214,369 tons, for it was in this year that the congestion which occurred at Howrah as the result of boating wheat and seeds thence to the ship led to a diversion of this important trade to the dock, its natural and economic terminal, where it has since remained. From now on the docks may be said to have been in full use ; in 1898-99, 537 ships with a gross tonnage of nearly 2 million used the docks, as compared with 204 ships with a tonnage of just over half a million berthed at the jetties, and it could be said that most of the ships which discharged at the jetties went to the docks to load their outward cargoes, and also a large proportion of those entering the port in ballast, particularly colliers.

By this time it had been found necessary to provide additional accommodation for the coal trade ; there were in existence four temporary wooden jetties suitable for loading by coolies in No. 2 dock and a fifth berth had been provided in the tidal basin known as No. 14 berth, but the rapid growth of the trade pointed to further accommodation, and during the year 1900-01 it was decided to construct two permanent berths with pucca walls in No. 2 dock, this being the real commencement of the dock's extension on permanent lines ; of these two permanent berths it was proposed to equip one—No. 20—with an experimental crane and skip system of mechanical loading designed by Mr. Beckett of the Bengal-Nagpur Railway. This system was recommended by a special committee appointed to consider the question as that best adapted to meet all the peculiar circumstances of coal loading in the Kidderpore Docks ; it is a variant of the well-known Lewis-Hunter system so successfully used at Cardiff, but while the latter tips a whole wagon load of coal, say 10 tons, direct into a single bottom-opening skip which is then swung direct on board the steamer, the Beckett system, in order to meet the large use of covered wagons for the carriage of coal, provides for the unloading by hand of the coal into an intermediate hopper from which the skip is filled. Thus the plant requires a large head of labour and is only partially a mechanical loading plant. As a compromise, however, it has proved a success and, save in periods of exceptional labour difficulties, can do a good day's work year in and year out with low working and maintenance costs.

During the period from 1901 to 1913, the period of Sir Frederick Dumayne's incumbency of the post of Vice-Chairman, many important additions were made to the facilities provided at the Kidderpore Docks. The transfer of the export trade involved almost at once the full utilization of the twelve berths in No. 1 dock and more accommodation was required. The first step was the enlargement to the utmost possible extent of the dock sheds, the original capacity of which had been rendered quite inadequate by the increase in the size of ships. The next was the conversion of No. 14 berth (on the south rapid quay of the tidal basin) from being a temporary coal berth into a general produce berth with a large double-storied transit shed, having a capacity of nearly three times the

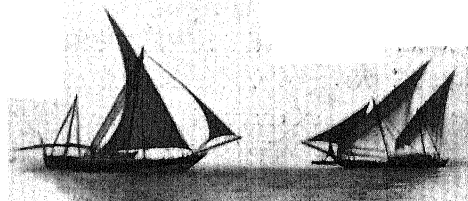


Old and New.

original dock sheds. Then with the rise of the import trade in Java sugar and in Burmah rice, more berths were needed, and four new berths with large modern double-storied sheds, averaging over 100,000 sq. ft. of floor, over each were constructed in No. 2 dock, to be followed in 1914 by a fifth. Thus the total number of general produce berths at Kidderpore was increased from twelve to eighteen.

At the same time a large amount of warehousing accommodation, with an aggregate floor area of over 900,000 sq. ft., was provided at Kantapukur in close proximity to the steamer berths, for the benefit of the export trade in wheat and seeds and the import trade in sugar and rice. Also in Hide Road large godowns were constructed for the use of the important hide and skin trade, and a riverside transit shed and a large sale tea warehouse were erected on the river bank immediately south of the docks.

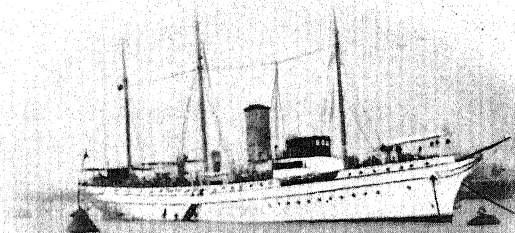
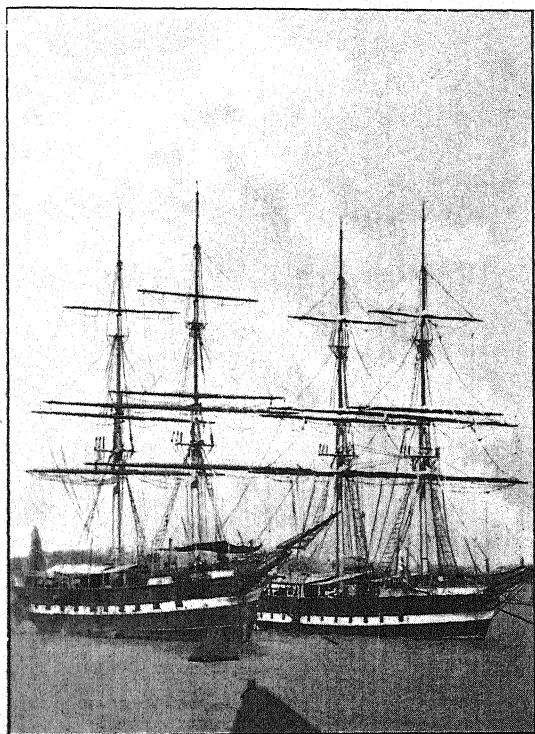
The position, then, at the docks at the outbreak of war was that there were 18 general berths (of which two were merged into one, reducing the number to 17) and 10 coal berths, with special accommodation for the wheat and seed, hide and skins and the trades. All of this was fully utilized and there was very little, if any, margin for development, so that, to provide for the future, it had become necessary, as in the case of the general import trade, to look elsewhere for the further accommodation, the necessity of which was generally acknowledged. This had been done by the acquisition of a large area to the south of the Kidderpore Docks, sufficient for the construction of a new and longer dock system and for revised and improved railway arrangements. The acquisitions included a long strip of additional river-frontage and on this it had been decided to construct five additional jetties—one for the loading of coal to replace a similar depôt on the acquired land which had belonged to the British India Steam Navigation Co., and four for general import and export trade which would give some measure of relief—while immediately down-stream from these it was proposed to place the entrance to the new dock system.



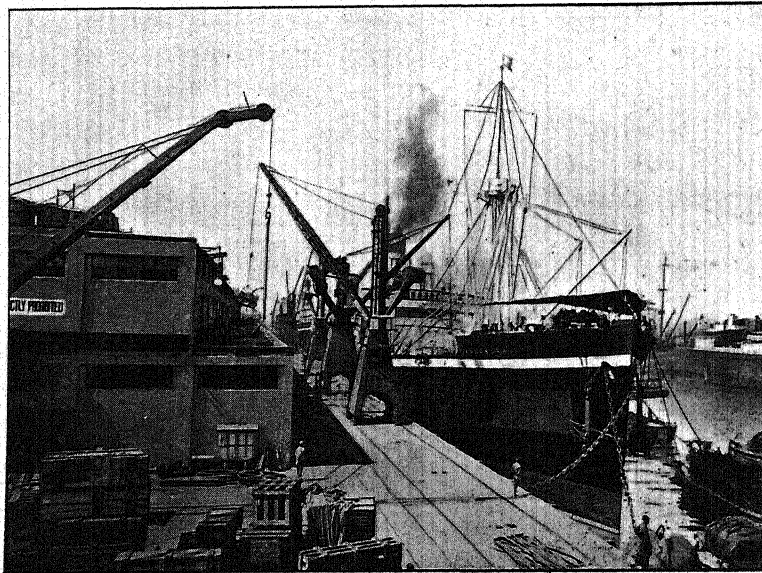
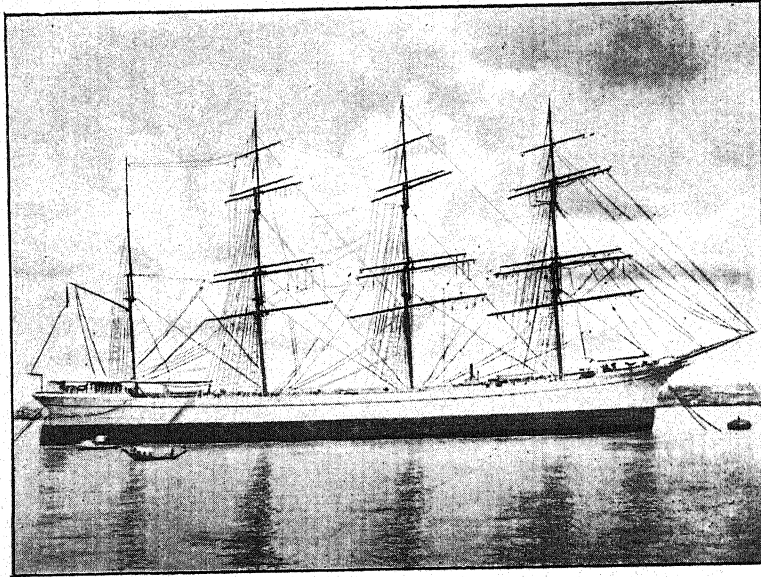
THE PORT AND PORT APPROACHES.

THE duties of the Calcutta Port Commissioners, as laid down in the Calcutta Port Act, are chiefly confined to the provision of facilities for and the handling of goods, with the consequential duties of raising money to provide the necessary works and appliances, of realizing suitable rates and charges to cover the expenditure entailed, and of giving to Government a proper account of the monies received and disbursed by them. Briefly and broadly speaking, therefore, this Act deals with the duties of a Port Administration in respect of the *goods* which are imported into and exported from it.

But there is another duty equally obvious and important, *viz.*, that of providing for the safety and convenience of the vessels in which the goods arrive and depart. This duty is covered by powers entrusted to the Port Commissioners under an Imperial Act, *viz.*, the Indian Ports Act XV of 1908, which applies to all Indian ports recognized by Government, and detailed in a schedule attached to this Act. The Indian Ports Act dates back to 1875, Act No. XII of 1875, when a number of enactments—twenty-six in all—dealing with different rights and duties, and a number of different ports, were consolidated and amended in that Act. It gave to the respective local Governments full powers to regulate the movement of vessels, laid down the powers and duties of Port Officers, provided for the levy of a port due to meet expenditure incurred on account of vessels, and laid down suitable penalties for offences under the Act. It was re-enacted in a modified and enlarged form in 1889; there were two Amending Acts in 1894 and 1896, a Consolidating Act in 1901, an Amending Act in 1903, and, finally, all previous enactments were consolidated in the present Act of 1908, from which the port authorities in different Indian ports derive their powers and responsibility in regard to the movement of ships within port limits. These limits are laid down in the schedule attached to this Act and by notifications issued by the local Governments. In the case of Calcutta, the Port Officer of Calcutta was at first declared to be the Conservator of the navigable river and channels leading to the port as then defined, and thus during the early years of the Trust's existence its members were not directly responsible for the safety and control of vessels within the port. In 1880 the amalgamation of the duties of the Port Officer, Calcutta, by whom this work had been undertaken, with that of the Port Commissioners was considered by a Special Committee appointed for the purpose. This Committee did not recommend the complete amalgamation of the duties of the Port Officer with those of the Port Commissioners, owing to the opposition offered by the members of the Pilot Service to the



Pilot Brigs—Old and New.



Two of Our Largest Visitors.

suggested transfer of that body to the control of the Port Commissioners. With this opposition the Lieutenant-Governor of the day expressed his entire sympathy, for the curious reason that the independence of the Pilot Service might be impaired if they were in any way responsible to a body composed largely of mercantile men and the representatives of the shipowners. The Committee, however, recommended that, while the Pilot Service should remain untouched, the control of the port approaches, including the supervision of the River Survey Department, the light-vessels and lighthouses, the houses of refuge and the Wreck and Anchor Department, should be made over to the Port Commissioners, with the consequential change that the Port Commissioners should be declared Conservators of the Port Approaches and recipients of the port dues. This recommendation was accepted by Government, and it was arranged to make over to the Port Commissioners free of charge the block belonging to the port approaches, including the lighthouse at False Point, on condition of their accepting the liability of replacing and maintaining all light-vessels, lighthouses, survey vessels, buoys, etc., required for the safe navigation of the channels leading to the port. The Port Officer remained in charge of the Pilot Service, and of the local Government vessels, the conduct of examinations and also all the duties attached to the Office of the Shipping Master, which was then amalgamated with that of the Port Officer. The port approaches block thus made over to the Port Commissioners included the three lighthouses at False Point, Saugor and Cowcolly, the seven light ships "Comet," "Mermaid," "Meteor," "Foam," "Canopus," "Planet" and "Star," the two river survey vessels "Clyde" and "Cuckoo," the steam launch "Tryon," the buoy vessel "Dolphin," the anchor vessel "Vulcan," and a number of smaller craft, all the river marks and tidal semaphores and gauges then in existence, the house of refuge in the Sunderbunds, and all the channel buoys, together with the staff employed at the lighthouses and on the vessels.

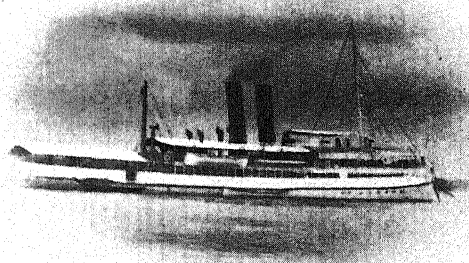
During the 40 years which have elapsed since their assuming responsibility for the port approaches, the Commissioners have modernized and extended the facilities for safe navigation in many ways.

Of the three lighthouses, that at *Saugor* dates back to 1821, but it existed at first only as a light exhibited from the top of a wooden tripod; the lighthouse was built in 1852 and then exhibited a light of 18,000 candle-power; in 1909 the old light was replaced by one of a modern type of 24,000 candle-power, and in 1911 the lighthouse itself was dismantled and re-erected on its present site, the erosion of the foreshore having rendered the original site unsafe. The lighthouse at *False Point*, near the mouth of the River Mahanadi, dates back to the year 1838, but the present light was first exhibited in 1880 and was converted into an occulting light in 1884. In consequence of the rearrangement of the boundaries of the Province of Bengal, the lighthouse, which is in Orissa, was transferred to the Behar and Orissa Government in 1915. The *Cowcolly* lighthouse is the earliest of all, the light having been first exhibited in 1810.

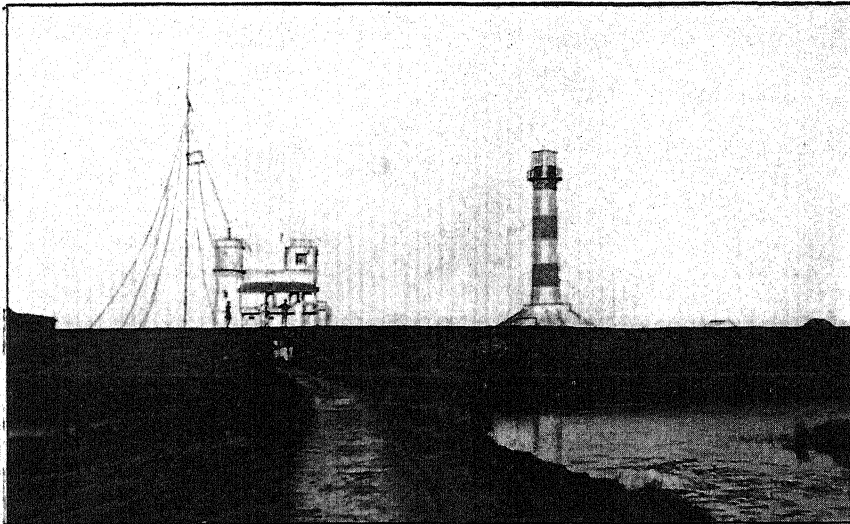
As regards lightships: in 1880 there were six "stations," which were known respectively as the *Eastern Channel*, first exhibited in 1816, *Mutlah* in 1857, *Pilot's Ridge* in 1861, *Intermediate* in 1877, *Lower Gasper* in 1827, and *Upper Gasper* in 1858. All these stations exhibited a fixed light of approximately 300 candle-power, and consequently it was impossible to distinguish one light from another at night, while the vessels themselves were painted grey, although it is essential that lightships should be distinguishable from the maximum possible distance, and in later years warships have been painted grey with the opposite intention. All these lightships were "attended," i.e., provided with full crews responsible for the maintenance of the light, display of blue lights, sounding of fog horns, etc.

There are now eight "stations." Of the two additions, the *Long Sand Light*, to mark the southern extremity of Saugor Roads, was first exhibited in 1883, but in 1905 was shifted to the head of the Middleton Bar and re-named the *Middleton Light*; while the *Gabtola Light*, to mark the head of the Gabtola Bar, was first exhibited in 1916. All lightships have been painted red since 1885. The five outer vessels have been re-fitted with powerful flashing lights of from 15,000 to 20,000 candle-power, the characteristics of each light being different from that of the others so that, with other improvements that have been introduced, the identification of the vessels is an easy matter. Two of the former attended vessels, at the *Upper Gasper* and *Middleton* stations, have been replaced by up-to-date "unattended" lightships, burning gas, with a flashing apparatus of the "Pintsch" type.

The improvements in the river proper have kept pace with those in the approaches. In 1880 there were 4 semaphores and 54 river marks; there are now 7 semaphores and 285 river marks; anchoring lights have been instituted at all important anchorages, and the number of buoys defining the channels has risen from 107 to 126. The most marked improvement, in expediting the movements of shipping, has been the lighting of the channel from Mud Point to the sea, by means of modern gas buoys, so that vessels can navigate this portion of the estuary by night. The value of this improvement is particularly great in the case of vessels outward-bound, as while inward-bound vessels, provided their speed is sufficient and their draught not excessive, will generally have sufficient rise of tide to negotiate all the bars from the sea to Calcutta on one flood tide, outward-bound vessels must meet a succession of tides and there are two bars in the Upper and three in the Lower Reaches which must be negotiated with a sufficient rise of tide. Vessels, therefore, leave Calcutta at such time that they can cross the Moyapur Bar, 18 miles below Calcutta, as early on the flood tide as their draught will permit, and thus negotiate the Eastern Gut Bar as soon after high water as possible. As the tide is then ebbing, it is dependent upon the vessels' draft and speed and the depth on the Balari Bar, 52 miles below Calcutta, whether they have sufficient water to cross it on the same tide. If they are able to do so, they then anchor in one of the Jellingham anchorages as the tide



S.S. Retriever.



Saugor Lighthouse.

has fallen too low to permit them to cross the Gabtola Bar, but can get under weigh when the night flood tide serves and are out of the river within 24 hours. Before the channel was lighted, they could not proceed until the tide served on the following day. When the adoption of night navigation, from Mud Point to the sea, was first proposed, some objection was raised by the Pilot Service on the score that the facilities offered were not sufficient for safety, but finally the Commissioners' arrangements were accepted, on the understanding that they would station an attended light vessel in the Gabtola channel, which was done in 1916. The facilities originally provided were appreciably enhanced by the construction of an automatic, electrically-illuminated night semaphore, which was invented by Mr. H. G. Reaks, the River Surveyor. This semaphore, by means of a combination of lights exhibited on high masts, displays the rise of tide at Phuldobi, for the guidance of vessels navigating the Gabtola Bar.

A river of the nature of the Hooghly necessarily requires a very complete system of surveying. This duty is carried out by the River Survey Department, which works in four main parties, one between the sea and Hospital Point, one between Hospital Point and Fulta Creek,—which limits include the James and Mary Reach,—one between Fulta Creek and Pir Serang and one between Pir Serang and Cossipore. Surveyors are also posted to the two large suction dredgers, to make daily surveys of the localities in which the dredgers are operating. In addition, Indian Serangs are maintained at Hooghly Point and Moyapur. The expansion in the output of work of the River Survey Department, since the Commissioners assumed control of the port approaches, is evidenced by the fact that while in 1882-83 the number of Plans and River Notices issued for the information of Pilots was 58, in 1919-20 it was 1,210.

Turning to the bars on the river, the Commissioners have endeavoured to effect their improvement by the use of large suction dredgers. The "Sandpiper" was first commissioned in 1907 and the "Balari" in 1913; a third dredger was ordered in 1914, and was commandeered by the Admiralty for war purposes, but a larger vessel in replacement is now under provision. The major bars in the Hooghly are the Moyapur and Eastern Gut in the Upper Reaches, and the Balari, Gabtola and Middleton in the Lower Reaches, the latter being of much greater extent than those in the Upper Reaches, but more stable. For these reasons, dredging operations have been almost entirely confined to the obstructions in the Upper Reaches where appreciable improvements have been effected. On the *Eastern Gut*, the mean depths—since dredging was first undertaken in 1907—are greater by 3 to 4 feet in the worst months than were available in the period 1875-1906, and 5 to 9 feet than in the middle of the century. On the *Moyapur Bar*, where the tendency to a bar formation is more continuous than on the Eastern Gut, the mean depths have been increased by 2 feet 10 inches over those of the period 1875-1906. In addition to the bars in the Upper Reaches, the crossings between Calcutta and Moyapur often constitute an obstruction

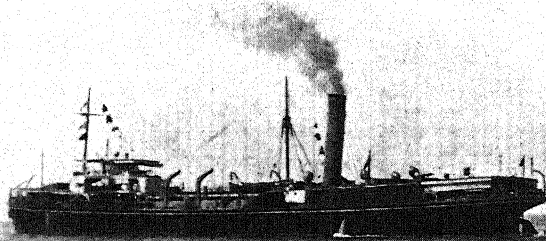
to deep vessels as, owing to the fact that vessels leave Calcutta on the last of the ebb tide so as to meet the flood tide at Moyapur, they must be negotiated at or near low water. These obstructions are at Panchpara, Pir Serang and Sankral. As the available depth at the time that outward-bound vessels negotiate them is about 24 feet or more, it is obvious that they were of little consequence when the deepest vessels only drew this amount of water, but, in recent years, with the increased draught of vessels, they frequently require dredging during the deteriorative season to prevent detention to vessels.

In view of the alarming rumours, revived at intervals, regarding the Lower Reaches of the river, a statement of the real conditions may be of interest. Mr. Reaks, in the valuable note prepared by him, which was attached as an appendix to the recently issued "Report on the Hooghly River and its Head Waters," says :—

"The channels in this section, as already stated, pass through great fluctuations but, comparing the general stability of the present channels, with a least depth throughout of, generally, 15 feet or more in the past 20 years, with the condition between 1848 and 1882, when, in only one year 1866, a depth of 15 feet was obtainable right through the estuary, it is obvious there can be no question of deterioration, even allowing for more accurate surveys at the present day. This is emphasised by a comparison of the present actual conditions of three stable bars; the Balari giving 16 feet 6 inches, the Gabtola 14 feet 6 inches and the Middleton 16 feet 6 inches depths, with the state in 1863, when the Rangafala, Auckland and Bedford channels were all in a very disturbed condition and provided best depths, respectively, of only 11 feet 3 inches, 13 feet 6 inches and 12 feet. In the worst condition in the past 20 years, which occurred in 1899, the Gabtola Bar gave 11 feet 6 inches at the same time as the Upper and Lower Balari Bars provided 14 feet 6 inches and 16 feet, respectively."

The clearest evidence of improvement is, perhaps, furnished by the following facts :— Prior to 1830 Pilots were prohibited from moving vessels drawing more than 17 feet at any time of the year between Calcutta and Diamond Harbour; in 1830 the limit was raised to 20 feet, vessels over this draught having to discharge part of their cargo either at Saugor or Diamond Harbour. In 1860 no vessel drawing more than 23 feet used the river; in 1870 none of over 24 feet and only 4 between 23 and 24 feet. In 1880 the maximum draught increased to 25 feet 2 inches, in 1890 to 26 feet 1 inch, in 1910 to 28 feet 3 inches, in 1911 to 29 feet 3 inches, and since then to 29 feet 10 inches. Taking tonnage as the criterion, in 1853, when the Hooghly Commission was considering the abandonment of the river, the largest vessel visiting the port was of 1,810 tons. By 1860 this figure had risen to 2,163 tons, by 1870 to 3,128 tons, by 1880 to 4,023 tons, by 1890 to 6,037 tons, by 1900 to 7,237 tons, by 1911 to 8,117 tons, and since then 12,989 tons. In length, vessels have increased from 368 feet in 1871 to 540 feet at the present day.

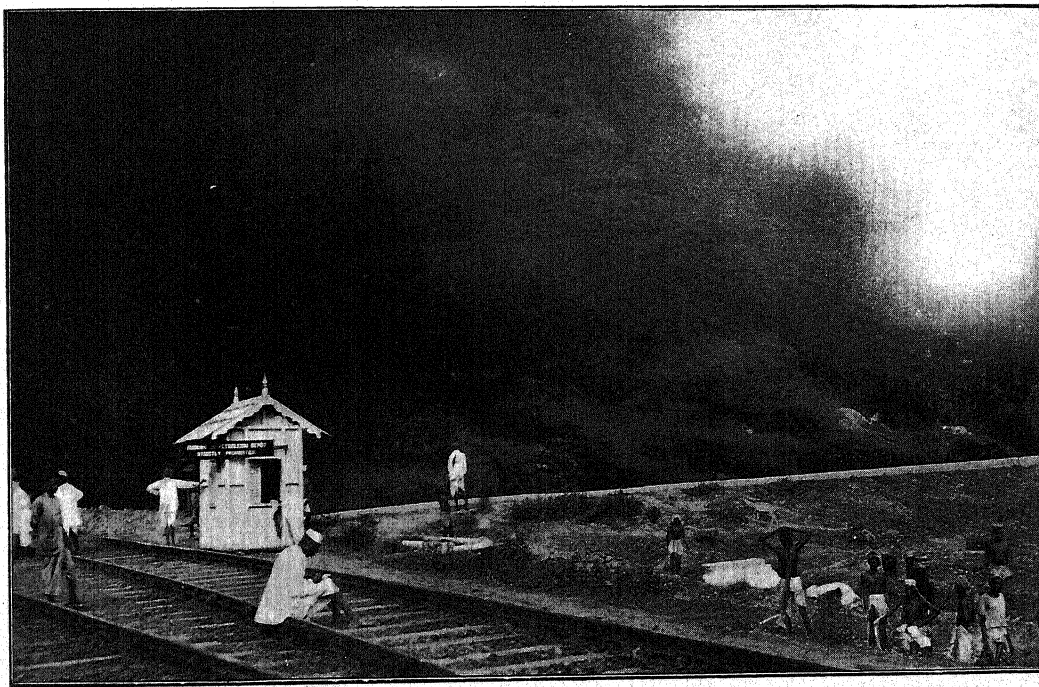
It must, of course, be remembered that, in the earlier years of the period under review, a large percentage of the vessels trading to this port were sailing ships which had to be towed up and down the river, that steamers had less engine power, and vessels everywhere were smaller. It must not be assumed, therefore, that the Port Trust claims the whole credit for the marked advance in the size and draught of the vessels that can navigate the river with safety. It can be fairly claimed that, by the great expansion in constant and exact surveys, by systematic dredging, the organization of the system of conveying information of changes to Pilots, improved lighting, and increase of navigational marks, the Commissioners have contributed very largely towards mitigating the danger and difficulties of the Hooghly. Credit is jointly due to successive Deputy Conservators, that so much has been done, and to the Officers of the Bengal Pilot Service, that the record of casualties to vessels in their charge has been so consistently low in a river when the difficulties to be encountered are so numerous and the risks so great.



BUDGE-BUDGE.

IN October 1882 the Commissioners considered a memorial addressed to the Lieutenant-Governor by merchants, agents and dealers interested in the petroleum trade, in which the necessity for the provision of suitable accommodation within the port for the landing and safe storage of kerosine oil was represented. Two sites at Garden Reach were suggested as suitable and the Commissioners at once authorised the making of enquiries regarding their comparative cost, with the result that some two months later alternative plans and estimates were submitted by the Vice-Chairman, one for site at Matiabruz and another at Kumhapara, the cost of each being about Rs. 4½ lakhs.

The Commissioners preferred the lower site, but decided to consult the trade to ascertain if the arrangements proposed and the charges necessary to cover their cost would be acceptable. While this reference was being made, Government had called for a report on the extension of accommodation within port limits for the general trade of the port, and it was necessary to postpone the petroleum scheme until the general question was settled. Eventually two Committees were appointed, a General Committee appointed by Government to consider the question of flash point and arrangements for the testing on arrival of the American case oil which then comprised practically the whole of the petroleum coming into Calcutta, and a second Committee appointed by the Port Commissioners a few months later to deal with the location of the proposed dépôt. The former recommended the selection of Matiabruz, but the latter pointed out that the cost of the Matiabruz site had been undervalued and that the accommodation proposed was insufficient to allow for the expansion of the trade, which had grown from 211,000 gallons in 1875 to over 12,000,000 gallons in 1882-83 with every prospect of further rapid and continuous progress. They agreed that the idea of Garden Reach as a possible site must be abandoned in view of the probable location there of the proposed wet docks and therefore discussed the selection either of Diamond Harbour or Port Canning. The objection to the former place was that ships could not discharge at stages or jetties but would have to use boats. This objection did not apply to Port Canning, but on the other hand there would be no return cargo available there and hence it was necessary to include in the scheme proposals for the attraction and handling of return cargo in order to justify their final recommendation that Port Canning should be selected. The estimated cost of the whole scheme aggregated some Rs. 6 lakhs and it was necessary to propose charges bringing



The Great Fire at Budge-Budge.

in a total income of Rs. 1,80,000 to meet the cost of the depôt. It was decided by the Commissioners to adopt this report and to forward it to the Chamber of Commerce for their opinion.

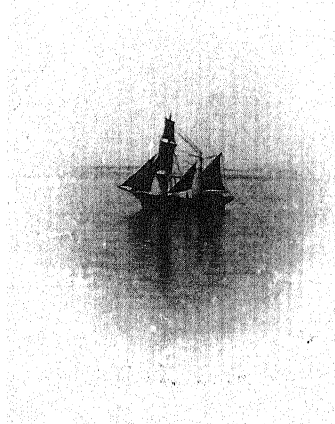
This was received in March 1884, when, after a largely attended meeting, the Chamber expressed the opinion that Budge-Budge was preferable to Port Canning and also to a special dock for the purpose, and asked the Commissioners to prepare an estimate for connecting Budge-Budge, then without any railway connection, with the Diamond Harbour line. Besides the necessity for completing the railway connection, there was another objection to Budge-Budge, *viz.*, the danger that burning oil might in the event of a serious fire be carried on the flood tide into the port of Calcutta. In February 1884 a ship named the "Aurora" laden with kerosine oil was discharging at Garden Reach, when a fire broke out on board; the fire engine vessel was unable to get alongside owing to the excessive heat generated and the danger of falling spars so that the whole ship was soon in flames. About midnight the vessel grounded breaking her back, and when the flood tide came, water entered the wreck and floated out the burning oil on to the river. It was largely the fears engendered by this experience which led to the preference for Port Canning. Still Budge-Budge was finally decided upon as giving on the whole the best proposal, and estimates were prepared, aggregating Rs. 1,70,000, covering the purchase of some 270 bighas (which formed the original petroleum depôt), the cost of sheds and landing facilities.

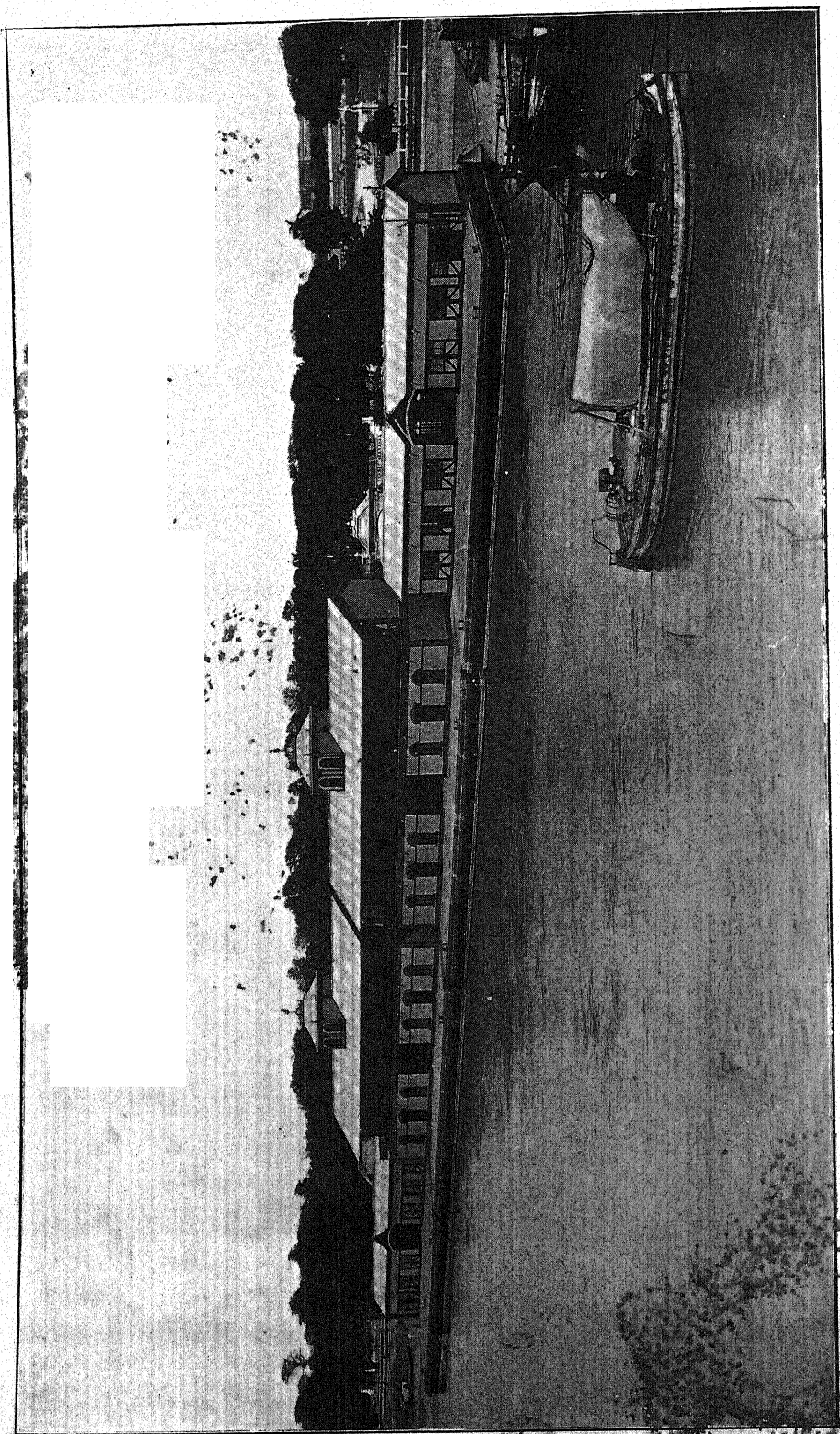
The last of the land required was handed over in February 1886 and, though work was somewhat delayed by financial difficulties, it was found possible to bring the wharf into use by July of that year. From this month it had been arranged for the southern limits of the port to be extended to Budge-Budge and also for vessels proceeding thence to Calcutta after discharge of petroleum cargoes to be brought up by Assistant Harbour Masters,—an arrangement recently terminated by the transfer of this duty to the Pilot Service to whom it properly belongs. As regards railway communication, the Commissioners had for some time urged the necessity of extending the line to Budge-Budge and in November 1886 they submitted plans and estimates for the extension of the line they were then constructing from the docks to Akra as far as the new petroleum depôt. Eventually, however, the line was constructed by Government, the Commissioners making over to the Eastern Bengal Railway lines which existed between Chetla Hât and Akra in consideration of the sum of Rs. 2,28,054, the Commissioners on the other hand being responsible for the sidings within the depôt.

The growth of the traffic was remarkable. In the first complete year of working the imports amounted to nearly 25 million gallons, and by 1889-90 this had increased to over 37 million gallons. The last few years had seen considerable imports of Russian oil, but, owing to bad packing and inferior quality, this was not appreciated by the public and

imports began to fall away. Before long the importation in cases began to give way to imports in bulk. The first firm concerned in this development was Messrs. Graham & Co., who in 1892-93 imported $1\frac{1}{2}$ million gallons in bulk and by 1899-1900 were annually importing some 10 million gallons in this way. Messrs. Gillanders, Arbuthnot & Co. followed suit in 1897-98, and two years later Messrs. Shaw Wallace & Co. By the latter year the case oil had reached its apex and then commenced to decline in favour of the bulk imports, but the total for that year (1899-1900) was nearly 43 million gallons of which nearly three-fourths was in cases and the remainder in bulk. The value of the rail connection was obvious from the first and the proportion of oil removed by rail rose rapidly to 56 per cent. in 1889-1900 with a corresponding reduction in boat delivery. It was about this stage that Burmah oil entered the Indian market; the first shipment had been in 1896-97, but within 15 years the shipments from Rangoon totalled over 12 million gallons in bulk, as compared with 19 millions from Russia. For the year 1919-20 the total imports of kerosine, fuel and batching oil were 99 million gallons, and of petrol 39 million gallons.

The depôt has known one serious casualty, a fire which commenced in the evening of 31st March 1903, and burnt furiously for several days, leading to the complete destruction of the shed in which it originated, and the loss of some 393,000 cases of oil, the total amount of damage amounting to about Rs. 15 lakhs. Though it was found quite impossible to extinguish or even to check the burning of this shed and its contents, any spreading of the fire was prevented by the measures taken, and the loss and damage was thus confined to comparatively small dimensions. The lay-out of the depôt has since been improved in many respects and no other fires or serious alarms have occurred.





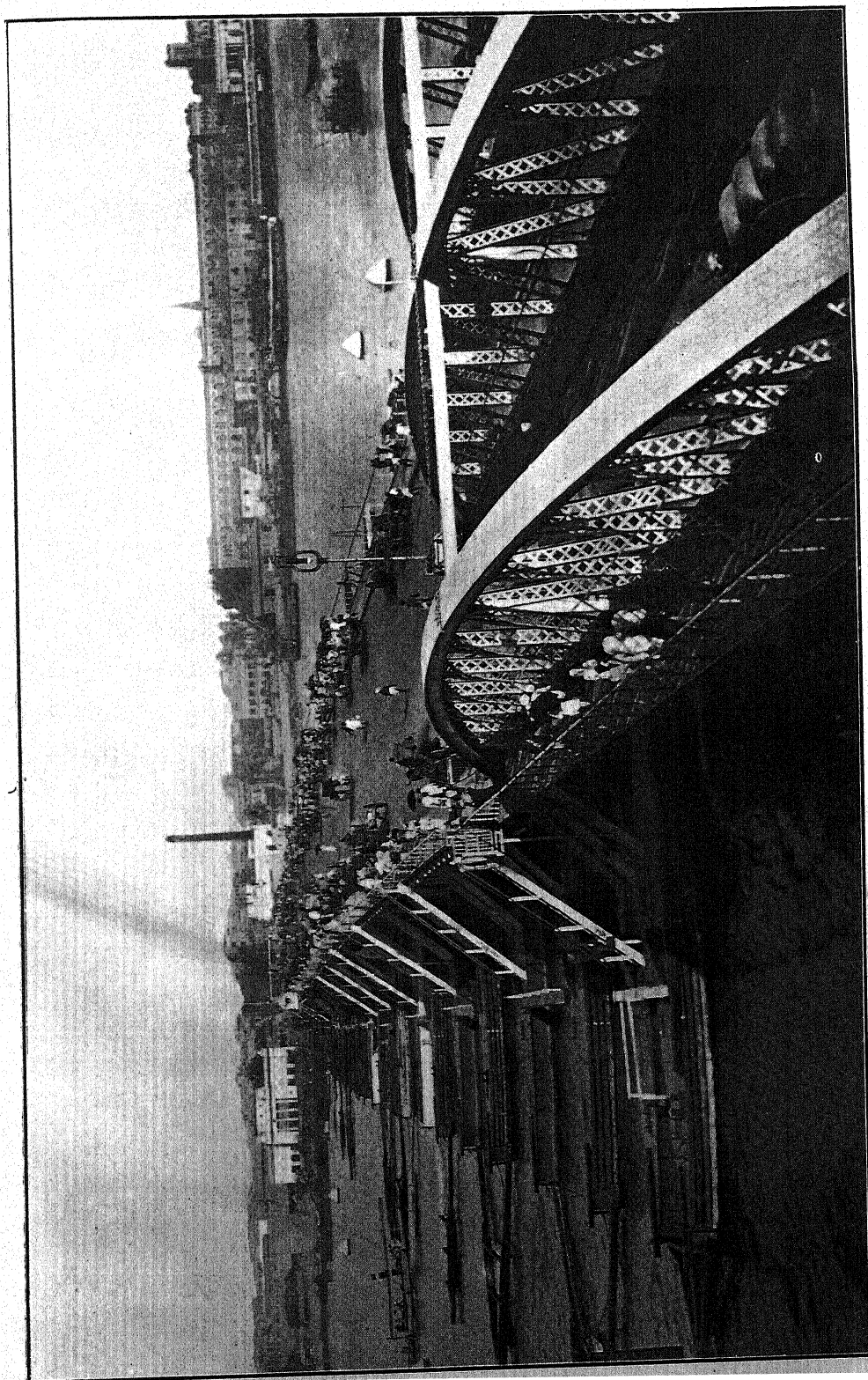
Outram Ghât.

FERRY SERVICE.

THE beginnings of the Commissioners' ferry service go back as far as the year 1901, when the question of ensuring safe and convenient means of transport for public use between the opposite banks of the river within port limits came under their consideration. There were existing at that time a steam ferry between Ahiritolla Ghât and Sulkea Bunda, the Howrah bridge ferry running only whilst the bridge was open between the East Indian Railway's pontoon and Armenian Ghât, and the services of the Calcutta Steam Navigation Co., which included a run between Chandpal Ghât and Shalimar. The Commissioners received four offers from private firms and companies for the establishment of ferry services, the most complete of these being from the Arracan Co., to build and run six ferries across the river and a service along the banks within the port. The Commissioners had no difficulty in deciding that better facilities than then existed were urgently needed, but some doubt was felt at first as to whether the duty of providing them should be undertaken by the Commissioners themselves or entrusted to contractors. The difficulty felt about the latter course was that any firm undertaking such a contract would almost certainly stipulate for a monopoly, as without it they would be exposed to the intrusion of others on the more remunerative portion of the work, while expected at the same time to maintain the less paying part. On the other hand, it was felt that any interference with the free use of the river, such as would be caused by the grant of a monopoly, would be resented by existing interests. This difficulty pointed to the desirability of the Commissioners themselves undertaking the work, but it was found that if they were to do so special legal sanction would be needed. When therefore a definite decision in favour of their initiating the service had been reached, a Draft Bill was prepared in which power was taken to construct vessels for the carriage of goods, merchandise and passengers to or from any point within the port, for the levying of charges, the power to enter into contracts, to regulate fares and to frame bye-laws. A number of technical and other difficulties arose, which delayed the passing of the necessary legislation. Two firms objected to the Commissioners taking power to carry goods within port limits, but were informed that the Commissioners did not contemplate any such work, although they thought it desirable to have the power in reserve. Finally, a Bill containing the necessary provision was introduced and passed as Bengal Act IV of 1905. Immediately afterwards tenders were invited for the construction of seven vessels to carry about 200 passengers each, and an order was placed with Messrs. Thornycroft & Co. for the whole seven boats, which were to be twin-screw

vessels with a speed of 12 knots, delivery being promised by the end of 1906. These boats were erected in Calcutta and, after the provision of pontoons and gangways, the service was commenced on the 1st October 1907. It comprised, in the first instance, three runs above and three below the bridge, *viz.*, three services from Sulkea to Burra-Bazar, Ahiritolla and Bagh-Bazar, respectively, and three from Chandpal Ghât to Telkul Ghât, Ramkristopur and Sibpur, respectively. The results of the first six months' working showed that the service met a real want on the part of the public, as over 20,000 passengers were carried in the first class and more than two million in the second class; from the financial standpoint, however, it was not specially encouraging, as the running expenditure exceeded the earnings and left no provision to meet fixed charges on the cost of vessels and ghâts. During the next two years, while the number of passengers in both classes rapidly increased, the working expenditure still exceeded the earnings, but this fact did not deter the Commissioners from extending the service. In 1910 four more steamers were obtained, and five more stations, *viz.*, Bally, Sibutolla, Kuti Ghât, Cossipore and Uttarpara, were opened, all these being within the northern section, while below the bridge an experimental service from the Howrah Bridge was tried but without success. In 1912 two more special shallow-draft vessels were obtained and three more stations, *viz.*, Matiabruz, Rajabagan, and Rajganj, were opened, all these being within the southern section. In 1913 a station was opened at Tuckta Ghât, and a little later that at the Botanical Gardens was made permanent. During these extensions the financial results of the service distinctly improved, and from 1910-11 onwards the working expenditure has been more than met by the earnings, though in no year has the excess been sufficient to meet the whole of the fixed charges incurred. During the war the service was seriously affected by the necessity of placing a number of the boats at different times at the disposal of Government; in particular, loss of the two shallow-draft vessels, which had been requisitioned for service in Mesopotamia in September 1916, and were finally retained, made it impossible with the remaining number of boats to maintain a satisfactory service on the southern section. Hence it was arranged as a partial and temporary measure of relief to utilise, so far as possible, the two Howrah Bridge steamers, "Howrah" and "Buckland." These vessels, however, have been found expensive and not altogether satisfactory for the purpose, and in August 1920 the Commissioners placed an order for two paddle-steamers smaller than the "Howrah" and "Buckland," but of greater capacity than the twin-screw vessels built by Messrs. Thornycroft & Co.

The growth of the service is shown by the statement that the total number of passengers and aggregate receipts has grown from 2·3 million passengers and Rs. 46,132 in earnings in 1907-8 to 11·4 million passengers and earnings of just over Rs. 5 lakhs for the year 1919-20.



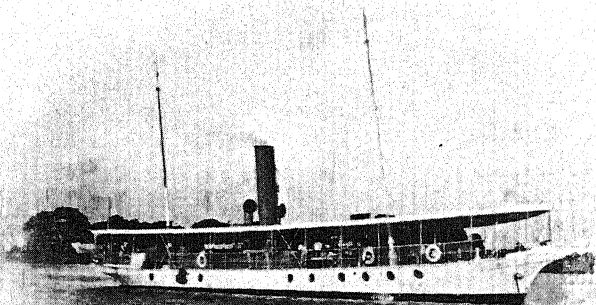
Howrah Bridge.

THE COMMITTEES OF ENQUIRY—1901 AND 1913.

IN 1901 a Committee was appointed under the Chairmanship of the Hon'ble Mr. E. N. Baker, I.C.S., C.S.I., Secretary to the Government of Bengal, to enquire into the working of the Calcutta Port Trust. This Committee dealt mainly with the finance and accounts of the Trust. A new and improved system of accounts was suggested and the placing of greater reliance on a flat rate called the river due rather than on payments for specific services. The charges for services to ships were revised and new rates were introduced. They advised the increase of accommodation at the jetties by the building of large double-storied modern transit sheds to replace the old single-storied ones. They came to the conclusion that so far as the docks were concerned no capital expenditure would be justified as the capacity was sufficient for all probable requirements, but they suggested the introduction of mechanical loading appliances for coal and an enhancement of rates. Perhaps, the most emphatic and sweeping proposal that this Committee made was that the post of Vice-Chairman and Chief Engineer should not in future be held by the same officer. They concluded their report with the following statement: "It is our unanimous opinion that, as a whole, the work of the Trust has been well done, and that, to use the words of our sub-committee, the Trustees have not been unmindful of the duty which lies on them of improving facilities and of providing in advance for the expansion of trade."

It was early in the next and last decade of the half century that there occurred the marked development of the European import trade which threw so heavy a strain upon the facilities available as to lead to the appointment in 1913 of the Special Committee, with Sir William Duke as Chairman, appointed by the Government of Bengal, to enquire into the existing facilities and the present and future requirements of the Port of Calcutta. During 1911-12 the construction of an additional berth known as No. 9 had been sanctioned, and it was also decided that the older berths, *viz.*, Nos. 3, 4, 5 and 6, should be reconstructed on modern lines, a decision which was subsequently modified as not affording a complete or final solution of the difficulty. The Committee's report showed an extraordinary development both in the value and tonnage of foreign imports. The aggregate value of the imports of private merchandise, including both foreign and coasting trade, had risen from Rs. 23.77 crores in 1882-83 to Rs. 69.9 crores in 1912-13, and the tonnage of the more important articles from 446,000 tons (excluding piece-goods) in 1882-83 to 1,677,000 tons (including piece-goods) in 1912-13. The development had been especially marked during

the last 20 years in which the tonnage had more than trebled, representing an annual rate of increase of about $5\frac{3}{4}$ per cent. During the five years from 1908-1913 the number of vessels accommodated had varied between 272 and 297, their nett tonnage between 921,812 and 1,024,682, and the quantity of goods handled by the Commissioners risen from 718,952 to 965,906. The growth which had taken place was found to be largely due to the great increase in imports of iron and steel including corrugated iron, while it was also believed that the proportion of goods discharged on to the jetties had increased, as compared with that delivered overside. It was generally recognized that the number of jetties available (which was at that time seven, with No. 9 still under construction) was entirely inadequate to deal with this quantity and description of foreign imports, especially as four of the berths were of an old type, with small sheds and in some cases unable to accommodate the larger steamers. The Committee considered the proposal to construct two more jetties to the south of No. 9, and to reconstruct the old ones, but rejected these measures as inadequate. They expressed the opinion that the overflow of the import trade must in the near future be provided for at Garden Reach, that the transfer to that locality might be gradual, and the transition period might occupy a considerable time, but that the whole trade should eventually be so transferred, the jetties being then allocated for the use of the coasting and far eastern trade, which it was thought could profitably utilize the accommodation as fast as it could be set free. This decision has never been seriously questioned and remains the key-note of the Commissioners' future policy.



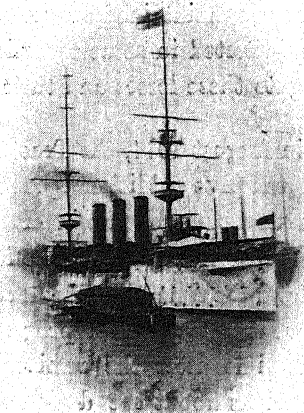
THE PORT TRUST AND THE WAR.

THE most dramatic way in which the inhabitants of Calcutta were brought into contact with the Great War was the sinking by the " Emden " in the Bay of Bengal of five Calcutta steamers and her consequent bombardment of the neighbouring port of Madras. From any attempt at such direct attack Calcutta was saved, no doubt, largely by the difficulties of navigating the Hooghly. Later on during the struggle the presence of floating mines in other Indian waters caused some perturbation, but Calcutta escaped any direct suffering from the great struggle maintained over a period of more than four years ; and while her trade was seriously affected in some directions, there were countervailing influences which went far to mitigate these losses and their economic consequences.

At the outbreak of the war in August 1914, the Trust had made a commencement on a part of its extension scheme in the five additional berths in Garden Reach and the construction of an additional four-storied warehouse in Hide Road, but work at the King George's Dock had not actually commenced. The general effect of hostilities was to suspend work at the Garden Reach berths from the time when further shipments of materials became practically impossible and to prevent any material progress being made with the King George's Dock scheme until some time after the armistice, but it was found possible to complete the preliminary discussions about the dock scheme which in any case would have been necessary and also to carry out an instructive experiment by the sinking of three trial wells or monoliths, from which valuable information of the strata to be encountered was obtained.

As to the ordinary current work of the Trust, the most noticeable effect of the war was a large reduction in the export of coal, owing to the reduction of tonnage available, and particularly, in the later years, a large decrease in the miscellaneous import trade. The import of sugar and rice at the docks and the export of general merchandise were maintained at something like their ordinary level ; a proportion of the former was carried in neutral ships and much of the latter was essential to the prosecution of the war, particularly the export of sandbags and manganese ore. The decrease in earnings was met by the imposition of special war-surcharges, which enabled the Trust not merely to meet its necessary expenditure, but also to extinguish the heavy depreciation which occurred in its securities, besides making some additions to its reserve funds, which left it at the end of the war in a stronger financial position than it had known before.

The direct contribution of the Trust to the prosecution of the war comprised both of personnel and material. At the commencement the Trust resolved to offer every inducement to those desiring to volunteer, and a large number of its employees in all ranks rendered valuable services both ashore and afloat. Three officers lost their lives : Mr. H. J. Hilary, Vice-Chairman, and Messrs. Grimwade and Robertson, Assistant Traffic Managers. As regards material, the Commissioners' new dredger and fire-float were requisitioned by the Admiralty in England, two of their ferry steamers and one launch in India ; while a large number of wagons, five electric cranes and a quantity of miscellaneous material were placed at the disposal of Government. The result of these requisitions and the subsequent replacement of the plant at higher cost involved the Trust in a loss of some Rs. 15 lakhs.



CONCLUSION.

It is of interest to attempt at the end of this survey of 50 years' work a summary of what has been done within the period.

In 1869 the Trust took over four screw-pile jetties of the T-headed type, fitted with steam-cranes and sheds which had cost altogether Rs. 5.3 lakhs and also two more in process of construction ; also a wharf for inland vessels, offices and some minor works. The total " block " then stood at Rs. 10 lakhs. During the first six months' work 52 vessels with a total tonnage of 47,774 were accommodated at the jetties, and the gross aggregate tonnage entering the port (including all vessels which unloaded or loaded in the stream) was 994,391. The gross receipts for the first *half*-year were just over Rs. 2 lakhs. For the first complete year of working, the number of vessels accommodated at the jetties was 143 and their tonnage 222,446 ; the gross tonnage of all vessels entering the port was 1,131,185 and the gross receipts Rs. 10.8 lakhs.

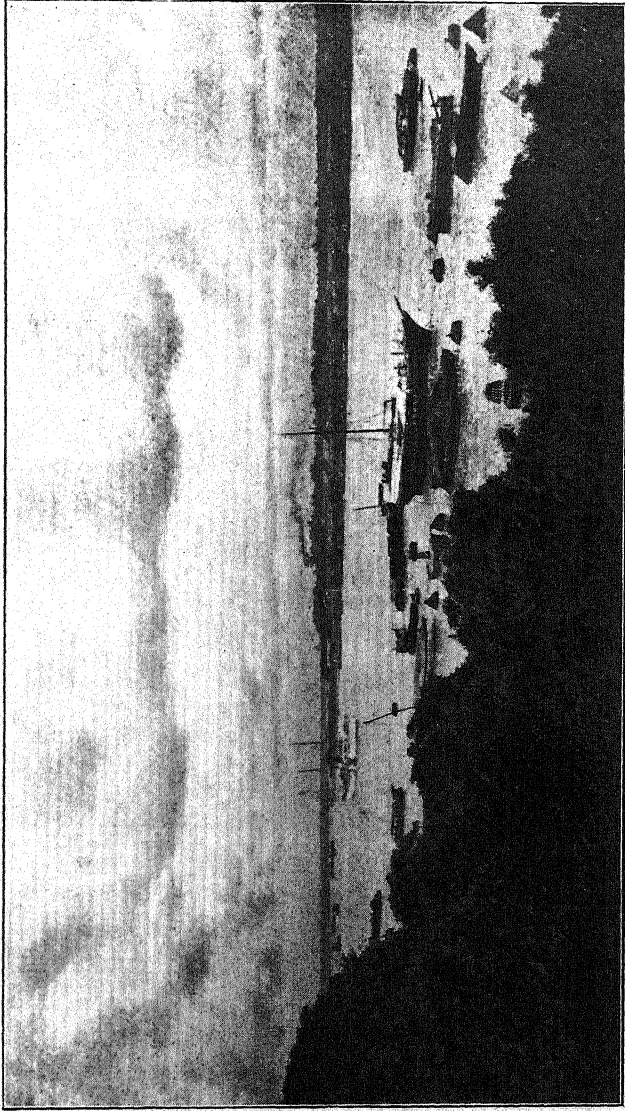
At the present time the Trust provides 11 jetty berths with three more under completion and has 27 berths in the Kidderpore Docks ; it has in addition 77 double moorings for ocean-going vessels, 78 moorings for smaller craft, 15 swinging moorings in the river, and seven buoy moorings in the docks. It has two large dry-docks for ocean-going vessels. At Budge-Budge it has a complete depôt for petroleum and petrol with seven moorings for ships. All jetty and dock berths are well provided with jetty and yard cranes and lift equipment, with railway connections and trolley lines ; it has two floating cranes in use, another on order, and a 100-ton sheer-legs. It maintains a fleet of over 130 vessels, comprising dredgers, tugs, despatch vessels, passenger steamers, launches and miscellaneous small craft. It has a ferry service of 13 boats carrying some 12 million passengers per annum. It has, besides the ferry service pontoons and a large number of pontoons for river steamers, two large passenger pontoons, one of which accommodates ocean-going steamers. It has its own railway system covering the whole of its working area, and giving direct connection with the three broad-gauge railways which serve the port, as well as providing facilities for the movement of goods within its own premises by means of its own rolling-stock, comprising 57 locomotives and 1,500 wagons. It has workshops, slipways and dry docks for its own vessels and plant. It owns some 3,733 acres of land in Calcutta and Howrah, a large part of which is riverside property, out of which over 400 acres is let out to different trades. It provides work for over 8,000 permanent employees, exclusive of workshop staff and cooly labour. It deals annually with some six million tons of cargo inward and outward of an approximate value of Rs. 250 crores or £250 millions. It deals with some 2,500 vessels per annum entering the port and the same number leaving with a gross tonnage of over 6 million. Its annual receipts are well over Rs. 2 crores and the value of its " block " is over Rs. 14 crores with an excess of assets over liabilities of some Rs. 4½ crores.

Yet all these facilities are admittedly inadequate for the great and increasing trade to be served and it has under provision, apart from the additional jetty berths already referred to, a large new dock system, which will provide 40 additional berths of the most up-to-date and complete type for the import and export trade ; two additional dry-docks for the largest vessels visiting the port ; a new marshalling yard capable of dealing with all railway traffic with ample margin for expansion ; additional quarters for many different grades of staff ; an additional dredger of a larger and improved type, a new tug, a new fire-float and a new and larger floating crane, besides a quantity of smaller craft, and additional rolling stock. It is undertaking an extension of its jurisdiction which will ensure complete and scientific surveillance of its head-waters and the régime of the river within port limits. It is improving the pay and prospects of its staff and hope to do more to ameliorate the conditions of their work and life.

Such a programme is one which involves large capital expenditure and this, in view of the high rate of interest now prevailing, will involve heavy and increasing burdens on revenue. Yet the trade of the port is expanding and the three great staples—coal, jute and tea—with the valuable miscellaneous import and export trade in other commodities, justify the confidence of the Administration that it will be able to complete the large scheme of additions and improvements which it has in hand and which it firmly believes will be found by the time they are in use to be more than justified by the requirements of the provinces served by the Port of Calcutta.

L'ENVOI.

Out of the silt and the marshes, where the Hooghly winds down to the sea,
Built we a port and a harbour, where the liner can rest at her quay ;
Grew there a trade that is world-wide, as the produce of mill, mine and plain
We bartered for goods from the Westward, the East and the Southern main ;
Fifty years have we laboured and prospered ; for how many more who shall say ?
Still we look to the future undaunted from our port at the head of the Bay.



HEAD OF THE BAY OF BENGAL

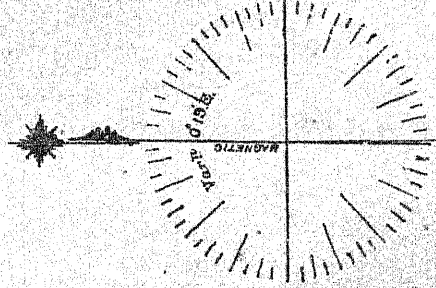
SHOWING THE JURISDICTION OF THE PORT COMMISSIONERS AND CONSERVATORS OF THE HOUGHLY RIVER WITH THEIR LIGHT HOUSES, LIGHT VESSELS, LIGHT BUOYS, ANCHORING LIGHTS, SEMAPHORE, AND TIDE GAUGES. THE BLUE TINT INDICATES THE LIMIT OF THEIR JURISDICTION.

LIGHTS EXHIBITED	
LIGHT HOUSES	
KAURHALL	1810
FALSE POINT	1837
SAUGOR	1852
LIGHT VESSELS	
EASTERN CHANNEL (ATTENDED)	1816
LOWER GASPAR	1827
MUTLAH	1857
UPPER GASPAR	(UNATTENDED) 1858
PILOT'S RIDGE	(ATTENDED) 1861
INTERMEDIATE	1877
MIDDLETON	(UNATTENDED) 1905
GABTOLA	(ATTENDED) 1916

ANNUAL ISSUE OF PUBLICATIONS	
1897-1898	1899-1900
CHARTS	3
PLANS	14
HYDROGRAPHIC NOTICES	34
MILES SOUNDED	1270
	7686

W. J. H. H.
DEPUTY CONSERVATOR.

BALASORE



PALMIRA POINT

B A Y O F B E N G A L



HEAD OF THE BAY OF BENGAL

Showing the Port Commissioners Jurisdiction as RECEIVERS OF WRECK

THE YELLOW TINT INDICATES THE LIMITS OF THEIR JURISDICTION

